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The Automobile

AN ILLUSTRATED MONTHLY JOURNAL

SOUVENIR EDITION
NOVEMBER 1900



FIRST ANNUAL SHOW
MADISON SQUARE GARDEN
NEW YORK

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The Automobile

AN ILLUSTRATED MONTHLY JOURNAL.

Vol. II.

NEW YORK, NOVEMBER, 1900.

No. 11.

The First Annual Show of the Automobile Club of America.

The first annual automobile show of the Automobile Club of America will open at Madison Square Garden, New York city, on Saturday, November 3d, at 8 P. M., and will extend through the following week. Forty-seven firms will be represented, including the largest and most representative in the country.

Aside from the sight-seeing pure and simple afforded at the exhibition stands of the several companies, visitors to the Madison Square Garden Automobile Show will have an opportunity to see the machines in motion around the eighth-mile track in the exhibition hall. The track opens to the street at one end, and it is expected that there will be from 50 to 75 vehicles in use by the exhibitors for demonstration purposes, both on the track and outside.

In addition to the above, there will be a series of contests on the track every afternoon at four o'clock and every evening at nine, each contest to last at least 45 minutes. The program of the contests is as follows:

Saturday evening, Nov. 3d, obstacle contest for steam vehicles.

Monday afternoon, brake contest for electrics; evening, obstacle contest for electrics.

Tuesday afternoon, brake contest for gasoline; evening, obstacle contest for gasoline.

Wednesday afternoon, brake contest for steam; evening, obstacle contest for steam.

Thursday afternoon, brake contest for electrics; evening, obstacle contest for electrics.

Friday afternoon, starting contest for gasoline; evening, tricycle coat and waistcoat contest.

Saturday, championship obstacle contest between winners in the three classes,

steam, electric, gasoline; evening, championship brake contest between winners of the above three classes.

The winners in each contest will be awarded diplomas. In the starting contest for gasoline vehicles on Friday, the machines will be started with all parts so cold that the hand may be borne with comfort on any part of the machinery. Competitors will start a certain distance from the machines, say 20 feet, run up to them, get under way as best they can, and travel the length of the straight side of the track—about 50 yards—to a line. In the coat and waistcoat race the start will be made from the middle of the straight side of the track. The competitors will start in their machines, stop at a post, dismount, unbutton coat and hang it on the post, then remount, ride to a second

stepping and starting contests between electric cabs, but it was feared by the managers of the electric liveries that this would prompt the drivers of these machines to practice "stunts" on the streets, and this project was therefore abandoned.

An interesting feature of the show will be the exhibition by individual members of the Automobile Club of America of privately owned racing and other notable machines. Albert C. Bostwick's Panhard racer will be there, and possibly others of his machines also. Alexander Winton is expected to show his racer, and S. T. Davis will show his "Locoracer." We understand that Dr. J. Grant Lyman's 8 h. p. touring Panhard will be there at least a part of the time also. These machines will be on the ground floor in the space ordinarily occupied by the restaurant,

at the Madison avenue and Twenty-sixth street corner of the building, the restaurant having been moved for the occasion to another room directly above and up two flights.

The obstacle contest will be carried out between tenpins, barrels, and other movable obstructions, and the machine getting through with the smallest disturbance of the obstacles in proportion to the time occupied wins the contest. There will also be a sort of "maze," with movable walls, which may be set to a distance apart proportional to the width of the vehicle, and

the machine will be required to enter this maze and back out again without disturbing the walls. The only condition placed on entries to the contests is that the machine entered shall be regularly exhibited at the show, and consequently it is not impossible that some of the privately owned machines above mentioned may take part.

A permanent Motor Exhibition is to be held in Munich in 1901.



CLUB ROOM OF THE AUTOMOBILE CLUB OF AMERICA—ELECTION NIGHT, OCT. 22.

THE AUTOMOBILE.

**The Automobile Club of America:
Its First Year's Work.**

Although the Automobile Club of America is only 17 months old, and was the pioneer organization in this country devoted to motor vehicle interests, it has already accomplished some important work and has made its influence strongly felt both in the industry and with the public at large. It has taken up the agitation for good roads with energy, and therein one of its most important fields of usefulness will doubtless lie. It has already announced a series of practical competitions to be held next spring, and it cannot be doubted that the exhibition now opening under its auspices will be the most important automobile show yet held in this country. The Club now represents in this country the automobile clubs of Great Britain and Ireland, France, Belgium, Switzerland, Germany, Austria, and Turin; and Mr. G. F. Chamberlin, its retiring active president, has recently been elected an honorary member of the French, Swiss, and Austrian automobile clubs.

On October 16, 1899, there were 100 active and 9 associate members, which were increased during the year to 236 active and 35 associate members, making a total of 271, 166 of which are owners of automobiles. Eleven members resigned, so that there is a membership at present of 260, exclusive of 14 honorary members. The finances of the club are in a very flourishing condition, the balance reported on October 1, 1900, being \$2,186.97. In connection with this it is of interest to note that before the doors of the show are open there is an assured profit to the club of \$2,704. To this will be added a certain portion of the gate receipts, so that the show will net the club quite a handsome profit. A good deal of this amount will probably be used in the building and fitting up of a club house, the purchasing of books, the offering of valuable prizes for the most practical, all around vehicles, and the employment of counsel to defend the rights and privileges of the members.

A very interesting report is submitted by Mr. A. C. Bostwick, chairman of the Runs, Tours and Contests Committee, where the following statement appears in referring to the failure of Mr. Winton to finish during the James Gordon Bennett Cup Race: "Another disadvantage he had was his mechanic's inability to speak French. If he could have spoken the language, it would have been possible to repair the harm done by the collision with the left bank, in my opinion; but I do not think that even this would have helped, as his car did not possess the speed of the French cars." The report continues: "A number of members have urged the giving up of road racing and substituting track racing. These races have proved conclusively that a car built to go on the road is not suitable for high

speed on a track, and that machines of light construction, with high power, should make the best time. In the end track racing will do more harm than good, as it will give people a wrong impression of what some cars will do. After years of experience and experimenting, France has come to the conclusion that to bring out the weak points of a machine, it must be raced on the road under the ever varying conditions of the road. The committee strongly advises the discontinuance of extraordinarily high speeds on the highway, as it does more to bring on unfavorable legislation than anything else. Also that no more road races be held without a permit from the proper authorities."

The Good Roads Committee's report is well covered by the article of the chairman, Mr. A. R. Shattuck, appearing in this issue, but the following recommendations, which the committee urge upon the state authorities, are of special interest:

(1.) Increased appropriations under the Higbee-Armstrong bill.

(2.) The collecting of the road tax entirely in money and receiving from the state a bonus on such collections of 25 per cent of the amount, thus doing away with the labor system.

(3.) The employment in each county of a competent and permanent engineer or road commissioner.

Mr. C. J. Field, chairman of the Technical and the Contests and Exhibitions committees, recommends the combining of these two committees into one consisting of ten members. It is proposed by these committees to hold some outdoor exhibition next spring consisting of an extensive series of contests and manoeuvres with motor vehicles, as would be permitted in some suitable outdoor space.

On the social side of the club's activity may be mentioned its eight runs and tours thus far, the longest being to Philadelphia, and dinners and luncheons given April 2 and April 25 to General Miles and M. L. Blanchet, respectively. Five lectures on automobile topics have been delivered before the club by well-known engineers, and a fifty-mile road race was run on April 14 over the Springfield to Babylon road, L. I., for the Blanchet cup.

It is encouraging to know that commercialism is left out of the club's affairs, and that to avoid suspicion in this direction, no officer can be a manufacturer. The newly elected officers of the club are: Albert R. Shattuck, president; Albert C. Bostwick, first vice-president; J. Dunbar Wright, second vice-president; David Wolfe Bishop, third vice-president; Jefferson Seligman, treasurer; Malcolm W. Ford, secretary; Dave H. Morris, Sidney Dillon Ripley and J. M. Ceballos, governors. In addition to these, the following governors hold over: Messrs. Lyon, Hollister, Buzby, Hall, Macy and Gen. G. M. Smith.

The Club's Work in Protecting the Rights and Privileges of its Members.

By George F. Chamberlin.

If it be true that the efficiency of an organization or a machine depends upon the fulfilment of the purpose for which it was designed, then it may be said that the youthful but vigorous Automobile Club of America has already attained a very fair degree of efficiency.

The constitution states that one of the objects of the club is "To co-operate in securing rational legislation and the formation of proper rules and regulations governing the use of automobiles in city and country, and to protect the interests of users and owners of automobiles against unjust and unreasonable legislation; and to maintain the lawful rights and privileges of owners or users of all forms of self-propelled pleasure vehicles, whenever and wherever such rights and privileges are menaced."

When the club was first organized the legal status of the motor vehicle in this country was undefined and uncertain; and public prejudice, as well as the outspoken animosity of many short-sighted horse owners, had to be overcome by an educational crusade. It is worthy of note in this connection that among the earliest champions of the free and unrestricted use of the parks and roads by motor carriages, may be included some of the foremost riders and drivers of horses in this country.

The real opposition came from those who represented trade or transportation interests, and who seemed to feel that in the new and improved method of locomotion their business was threatened.

Among the recent legal decisions affecting the rights of automobilists on the public highways, is the clear and strong opinion by Judge Sutherland of the Rochester municipal court, of New York. The conclusions of the judge, as stated in that opinion, are undoubtedly good law, and the breadth of view displayed in that opinion has been a material aid to the whole industry. The concluding remarks in the opinion referred to are as follows:

"The temporary inconvenience and dangers incident to the introduction of these modern and practical modes of travel upon the highway must be subordinate to the larger and permanent benefits to the general public resulting from the adoption of the improvements which science and inventive skill have perfected."

The need has been felt for a protective association, broad in its scope and national in its character. The Automobile Club of America may very properly supply this want, as it enters or should enter into close reciprocal relations with every automobile club in the United States, and must through these thousands of affiliated members wield a most potent influence in the protection of the legal rights of every motorist in the country.



ALBERT C. BOSTWICK.



A. R. SHATTUCK.



J. DUNBAR WRIGHT.



MALCOLM W. FORD.

Newly Elected Officers
of the
**AUTOMOBILE CLUB
OF AMERICA**



JEFFERSON SELIGMAN.



J. M. CEBALLOS.



SYDNEY DILLON RIPLEY.



DAVE H. MORRIS.

It has already through concerted action encouraged beneficent and important legislation. To concentrate the efforts of the club in this direction a Laws and Ordinances Committee was appointed, to look after the legal interests of the members and collect such data as would be of value in preparing the defense of their rights and drafting suitable bills for the consideration of state and municipal bodies. The year's work of this committee may be summed up in the following recommendations, which were submitted to the club:

First: That, it being the established purpose of this club to protect the rights and privileges of members as automobilists, the club authorizes your committee to retain counsel when necessary and advisable to do so, for the purpose of aiding, advising and actively assisting in the defense of any member, when such member's rights as automobilist are assailed.

Second: That the club use every proper means of preventing oppressive or restrictive legislation.

Third: That the club use every effort to secure a modification of the present ruling of the Inspector-General with reference to the carrying of gasoline on ferries.

Fourth: That the club by all proper means seek either the repeal or the modification by new legislation of the laws of the state of New York relating to the use of steam carriages on the highways of the state.

Fifth: That the club take prompt and energetic action to secure the opening of all parks and public driveways to the free and unrestricted use of automobiles.

Sixth: That the club make an active, earnest and persistent effort through its Good Roads Committee to secure from the Legislature of New York a liberal appropriation for 1901 under the Higbee-Armstrong act, for the continuance of good road building, and to meet the numerous petitions now on file in the state engineer's office from all parts of this state under the provisions of said act.

In regard to the first recommendation it may be added that a movement is on foot at present to affiliate all local clubs for the protection of the rights of members. There is to be a common fund for this purpose to be contributed to by the members of the various clubs.

The best way to disarm unfriendly criticism of sensitive horsemen is to strictly comply with reasonable legislation and fair municipal ordinances as to the use of motor vehicles on public highways, particularly so in regard to speed and when passing restive horses with timid or ignorant drivers. By so doing the automobilist will do much to prevent harsh and unnecessarily restrictive legislation in the future, which it may require years of effort to repeal.

The National Motor Co. of St. Louis is reported to have reorganized.

THE AUTOMOBILE.

New Styles of Automobiles.

The "Gasmobile" Surrey.

The Automobile Company of America, New York, builders of the "Gasmobile" touring phaeton, has recently produced the surrey shown in the illustration. This machine uses the same running gear and motive equipment as the single-seated vehicle, but is geared somewhat lower. The noteworthy feature of their latest type of running gear is the discarding of the reach connecting the front and rear axles. The entire weight of body and machinery is carried on four semi-elliptic springs, and the rear pair is so arranged that no distance rod is needed to keep the chain taut. The motor is of the three-cylinder type, and develops 10 h. p. under full load. The transmission gear comprises two forward speeds and a reverse, and is operated by a handle at the driver's left. Intermediate speeds are obtained by throttling. Side steering is used, and the reverse is operated by a pedal. A rotary pump maintains the circulation, and the bank of radiating tubes under the front boot prevents the water from boiling. Wood or wire wheels, 32 inches in diameter, are supplied.

The Steam Vehicle Co. of America's "Reading" Stanhope.

The above company, New York, which has been at work quietly for the past year perfecting its steam machine, will exhibit three vehicles at the automobile show, viz., a stanhope, a top stanhope and a delivery wagon.

The engine used by this company has four cylinders and is rated at 5½ horsepower. It has a novel circular valve which rotates in one direction. Especial attention has been given to lubrication, and the use of packing is avoided. The water and oil tanks are of liberal size, and no torch is needed in starting the fire. The brake is stated to hold the carriage in either direction. Our illustration shows the regular stanhope model.

The Canda Stanhope.

The Canda Mfg. Co., Carteret, N. J., makers of the Canda quadricycle, have just put on the market a stanhope propelled by two of their 2½ horse-power air-cooled motors, coupled together with the tanks opposite. As the illustration shows, the machinery is mounted on an angle iron under-frame, and the back of the body is left available for packages. The motor speed is constant, and a friction transmission varies the speed of the carriage from 3 to 15 miles per hour. The wheel base is 54 inches and the track 44 inches. The tank holds 3 gallons of gasoline and half a gallon of cylinder oil.

The Riker Golf Break.

The Riker Motor Vehicle Co., Elizabethport, N. J., has just added to its line the 12-passenger electric break shown in the photograph. It weighs 4,500 lbs., and is stated to have a capacity of forty miles on one charge, at a speed of 12 miles per hour. It is supplied with gong, electric side lights, umbrella basket and a coaching horn. It is upholstered in pig-skin and has plenty of space for parcels and hampers.

The Thomson Gasoline Runabout.

This machine, which is made by the Thomson Automobile Co., 2132 Market St., Philadelphia, is distinguished by its lightness of build. It has a single cylinder motor, weighing 150 lbs. and claimed to develop 5 horse-power. As will be seen, it has a solid rear axle, and each wheel is driven by chain from a countershaft in which is the differential. One lever operates the forward and reverse movements, and the brake is applied by the foot, the toe rail being hinged for this purpose instead of using a pedal. The weight of the runabout complete is 500 lbs.

The Holyoke Surrey.

The Holyoke Automobile Company, whose works are at Holyoke, Massachusetts, will show one of its cross-country touring surreys at the Madison Square Garden Exhibition. The Holyoke carriages are driven by gasoline engines and contain several novel features. There is no countershaft running and no gearing except for extreme hills. The body of the carriage does not carry any of the machinery.

The running gear consists of a frame of heavy channel irons, having the front axle pivoted. The engine is carried in its own frame, which is supported on transoms on the running gear, and carries the clutches and connected mechanism. The channel iron frame is supported on the rear axle by coiled springs inside the yokes, so that the engine, which is two-cylinder and vertical, is spring-supported and the jolting of the road reduced to a minimum. The ignition is electrical and of the make and break type, the current being supplied by a small dynamo which furnishes current also for side lights. The high-speed gear and the medium speed are both taken directly from the engine shaft by means of two clutches and a direct chain drive. There is thus no gearing in use the greater part of the time. For extreme hills and for backing, gearing is employed which is driven from the medium speed clutch. All the gearing is contained on the back axle and is removable with it.



FIG. 1. "GASMOBILE" SURREY.

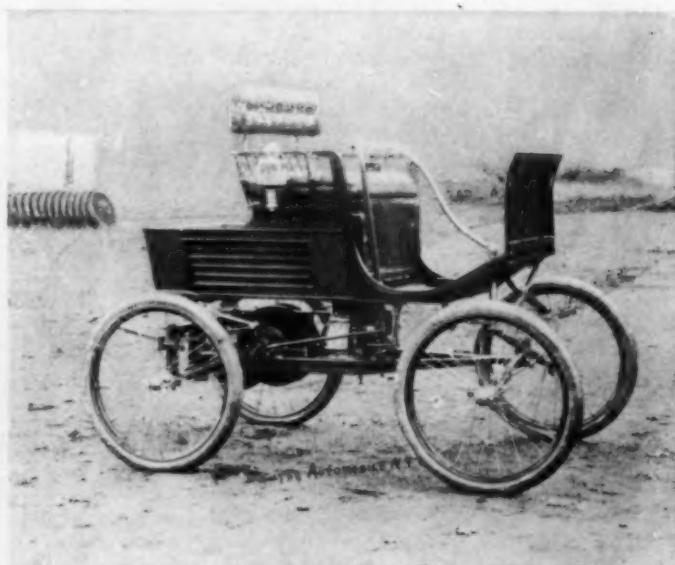


FIG. 2. THE CANADA STANHOPE.



FIG. 3. THE "READING" STANHOPE.

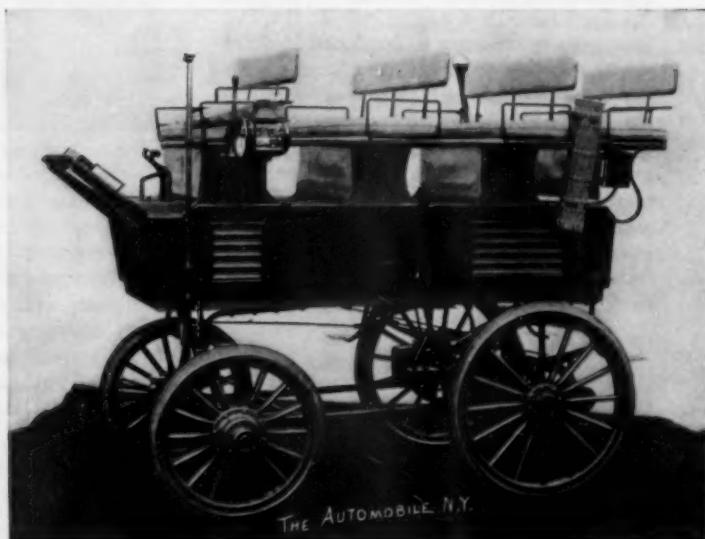


FIG. 4. THE RIKER GOLF BREAK.



FIG. 5. THE THOMSON RUNABOUT.



FIG. 6. THE HOLYOKE SURREY.

THE AUTOMOBILE.

Besides the gearing, the engine speed may be controlled by a throttle.

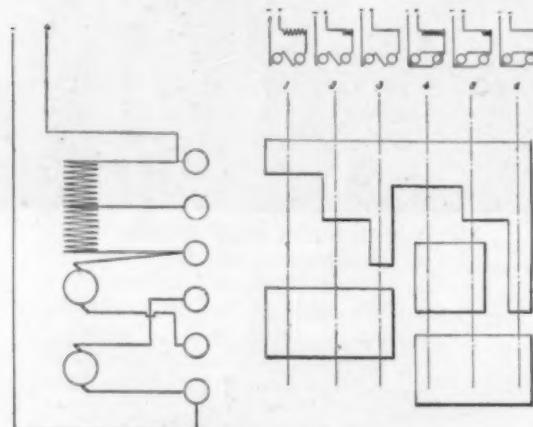
The carriage body is carried directly on the axles by double elliptic springs and has no other connection with the running gear, except the clutch and brake rods. Two powerful hand brakes, applied to the rear axle, will stop the carriage within seventy-five feet when running at full speed. A worm steering gear prevents the transmission of heavy shocks from the road to the steering handle.

The company's latest type of body is all of metal. The side, front, back and top of the seat are all made removable by the use of a small key.

A Simple Controller Diagram.

By George T. Hanchett.

In small electric vehicles of the run-about type, it is very desirable that the controller be light and small and consist of as few parts as possible. The accompanying diagram shows a series parallel controller controlling two motors and having quite a wide range of speed. It has six speeds in all and two running notches, that is to say, notches in which the full output of the battery is employed in driving the motors. Inasmuch as three speeds are often considered sufficient in automobile work, this controller presents some features of attraction. It has only four plates in the cylinder and six fingers. It is used in connection with a resistance which is divided into two parts and connected as shown. The speed combinations are shown above each of the notches in the small diagrams, and can be verified



A SIMPLE CONTROLLER DIAGRAM.

by tracing the connections. The reverse lever is a separate affair and is most conveniently some type of four pole, double throw switch.

A 8 Horse-Power Panhard Touring Vehicle.

By Herbert L. Towle.

The high degree of perfection to which European builders have brought the gasoline automobile, especially the high-powered racing and touring machines, is well known in this country. Starting as early as they did, and with the advantages of

splendid roads and liberal speed laws, such firms as the Daimler and the Benz in Germany, and Panhard & Levessor, Peugeot, and De Dion & Bouton in France, had solved most of the construc-

above and parallel with it. On the latter are keyed four spur gears of different diameters, and on the driving shaft is splined a sleeve with four other spur gears of such diameters as to mesh with



FIG. 1. DR. J. GRANT LYMAN'S 8-HORSE POWER PANHARD.

tional problems before self-propelled vehicles were built on a commercial scale in this country at all. In view of the wonderful records for speed and endurance made abroad, the way in which these problems have been solved cannot fail to interest all users of automobiles in this country, and it was with much pleasure, therefore, that the writer availed himself of the kind permission of Dr. J. Grant Lyman, of New York, to obtain photographs and a detailed description of his new Panhard touring machine.

This vehicle has a body of the "tonneau" style, having two seats vis-a-vis in the back, each seating two persons. It has not the extreme lightness of the racer, and its four-cylinder motor is rated only at 8 horse-power, but nevertheless it will handily go twenty-five miles

an hour on the level, and by the "accelerator" it may be speeded even higher. The larger photograph shows it complete, except for the motor bonnet, and the smaller one shows the motor mechanism somewhat enlarged.

In general arrangement the mechanism follows the usual Panhard lines. The flywheel is back of the cylinders, and contains a conical friction clutch connecting the crank shaft with the first shaft of the transmission gear under the footboard. The transmission gear comprises the shaft just mentioned, and an intermediate shaft

those on the intermediate shaft. The several gears are so spaced that only one pair is in mesh at any one time, and as the motor's speed is normally constant, the relative diameters of this pair determine the vehicle's speed. On the end of the intermediate shaft, just back of the spur gears, is a bevel pinion, which drives the one or the other of two bevel gears keyed to a sleeve splined on the countershaft. This shaft, which carries at each end a sprocket pinion driving the rear wheels, is divided and contains the differential gear, which on account of the high speed and small torsional effort of the countershaft, can be much smaller and lighter than if it were interposed in the rear axle. To change the speed of the vehicle the clutch in the flywheel is first disconnected by a pedal under the operator's left foot, thus allowing the driving shaft of the transmission gear to turn freely. Then the sleeve on that shaft is shifted forward or back till the desired pair of gears is in mesh. The pedal is then released and a spring re-engages the clutch. The machine is stopped by pressing a pedal under the right foot, which first disengages the clutch and then applies a band brake on the countershaft. As showing the pains taken to avoid unnecessary metal, the gear case is worth remarking. It is built up with a wrought iron framework, and the shell of the case is stamped of sheet iron and riveted to the framework. Owing to the shortness of the available time, I was unable to obtain access to the transmission gears, and

therefore give the sketch, Fig. 1, only as showing the principle of the arrangement and not as correct in detail.

Of the three levers at the operator's right, the innermost or nearest one controls the direction by shifting the sleeve on the countershaft, the second shifts the speed-changing gears, and the outermost or furthest one disconnects the clutch and applies a pair of band brakes next to the rear sprocket wheels. These brakes are used only in emergency, or when the braking power of the pedal-operated brake on the countershaft is insufficient. The crank case of the motor is cast in one piece of aluminum, and splash lubrication is used, with a large sight feed lubricator on the dashboard supplying oil to the crank case. Compression grease cups lubricate the outside bear-

To the writer's mind the most noteworthy feature of the Panhard machine is the design of its frame. As is now the case in very many of the Continental machines, there is no reach or other connection between the front and rear axles. All the weight above the axles is carried by the main frame, which is hung on the forward axle by two semi-elliptic springs, and supported behind on a pair of elliptic springs to which the rear axle is solidly bolted.

The chain tension is preserved by a pair of distance rods, and the tops of the springs, instead of being bolted to the body or frame, are bolted to an iron strap which extends across the body just under the frame. The ends of this strap are bent upward, so that it is prevented from lateral shifting, but is free to move a

couple of inches forward or back. A pair of iron straps, one under each end, guide and retain this transverse strap. The longitudinal component of any shock suffered by the rear wheels is therefore borne wholly by the distance rods, and the body in effect rests loosely upon instead of being attached to the springs.

Builders of motor vehicles are beginning to recognize that no such thing is possible as a perfectly rigid frame. It must spring somewhat, and the machinery must conform to this condition. More has been done in this direction in the Panhard machine, however, than in any other which the writer has inspected.

The main frame is built up of light channel iron, with the corners suitably braced, and the interior of each channel is filled by a wood strip riveted in place. The motor and transmission gear are mounted, not on this composite frame, but on a frame built of angle iron, narrower than the main frame and hung from it by six corner and side brackets. This iron frame is long enough to accommodate the motor and the transmission gear, and in Dr. Lyman's machine, although built to

stand rough work, it is surprisingly light. It is evident, however, that there is very little tendency for it to be deformed by the springing of the main frame, and such twisting as it gets will not sensibly impair the alignment of the clutch.

The water tank is in the rear of the body, or in this particular machine under the floor, and a centrifugal pump maintains the circulation. The gasoline tank, which is inside the front seat, holds eight or ten gallons. The vaporizer is of the constant-level float-feed type. The Panhard machines are fitted with either hot tubes or electric ignition, and their racers have both. Dr. Lyman's has hot tubes. The front wheels measure 34 inches and the rear wheels 39 inches. The tires are Michelin double-tube, of 90 mm. (3½ in.) section.

There can be no doubt that in their design of frame and running gear MM. Panhard and Levassor have solved the problem of durability combined with lightness in a masterly manner. No rigid frame could possibly endure the racking which these machines will stand. Dr. Lyman, in a brief conversation with the writer, was unqualified in their praise, although he considers them somewhat too noisy for city use. He mentioned a recent experience of his in returning from Irvington after dark. There had been some road repairing going on, and sundry large stones had fallen from the wagons into the road. "When you are going thir-

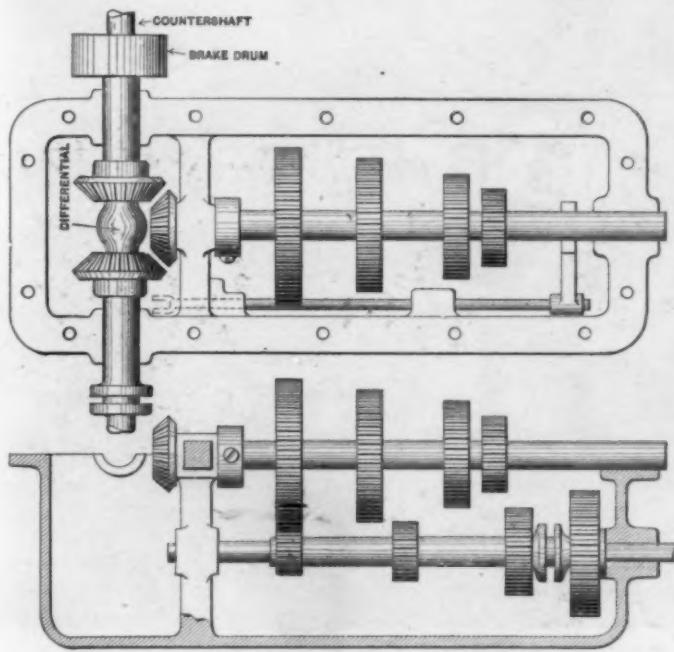


FIG. 2. PRINCIPLE OF THE TRANSMISSION GEAR.

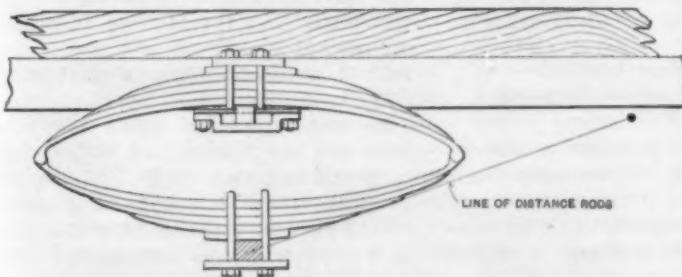


FIG. 3. HOW THE FRAME RESTS ON THE REAR SPRINGS.

ings of the countershaft, and a row of grease cups on the dashboard supplies the bearings in the forward part of the machine.

As usual in European machines, the cam shaft carries a centrifugal governor acting on the exhaust valves. With this is the "accelerator," as it is called, which puts the governor out of action, or by a contrary movement causes the motor to run more slowly. It is controlled by a small pedal adjacent to the brake pedal.

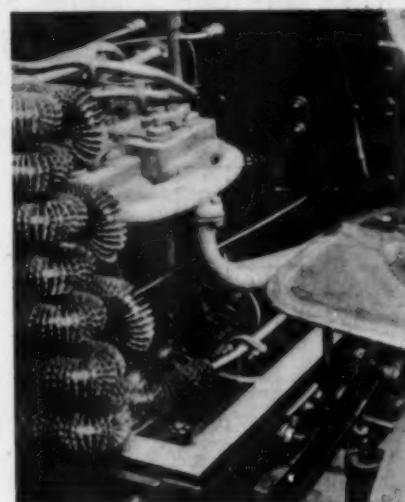


FIG. 4. THE MOTOR ENLARGED.

ty miles an hour," said Dr. Lyman, you come upon such things before you see them, and I would swear that our machine jumped a foot into the air when it struck those stones. You would have thought the tires would be ripped to shreds, but they showed no mark whatever, and so far as we could discover not a spring or a bolt was strained."

The latest thing in automobilism in Newport is the adoption of the term "bubbling."

Power Consumed Per Mile By Electric Automobiles.

By Hiram Percy Maxim.

The expenditure of energy per mile by a vehicle propelled by an electric storage battery is a more important consideration than is generally supposed. Small increases in the discharge rate have much greater effect in decreasing mileage, and small decreases much greater effect in increasing mileage than is usually understood. This is due to the rapid falling off of the available capacity of an electric storage battery at increased discharge

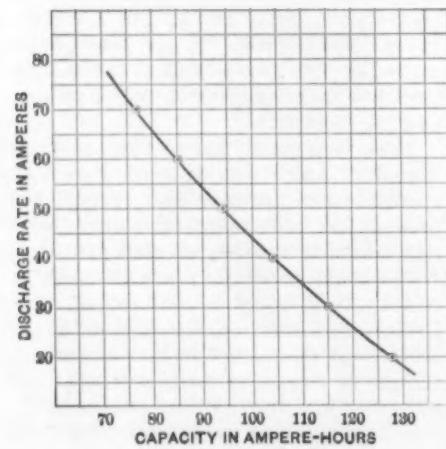


FIG. 1.—CURVE "B."

rates, and, on the other hand, to the rapid increase in available capacity at decreased discharge rates. In order to deal in definite figures a curve (Curve B) has been prepared, which shows the characteristics of a standard Columbia Mark XI. delivery wagon battery. This battery is of the Plante positive, chloride negative type, and of a sufficiently robust detail con-

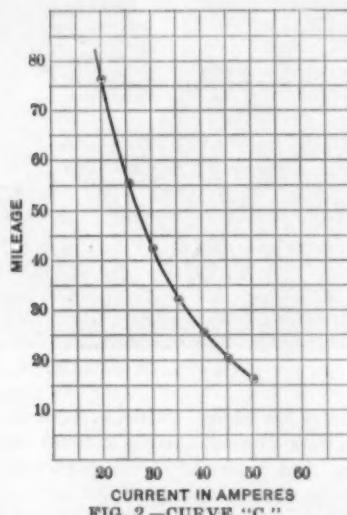


FIG. 2.—CURVE "C."

struction to stand hard service and keep its maintenance cost low. Each cell weighs 37.5 lbs. Forty-four of them in a single unit tray weigh 1,180 lbs.

Running on level asphalt and making no stops, with 325 lbs. of passengers and 600 lbs. of merchandise on board, representing a total weight of 5,425 lbs., this wagon was found to require 229.47 watt

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hours per mile at a speed of 11 miles per hour.

The average voltage was 83. The speed being at the rate of 11 miles per hour, the time in hours to go one mile must have been .091 hours. The average cur-

$$\text{rent must therefore have been } \frac{229.47}{83 \times .091} = 30.5 \text{ amperes.}$$

At 30.5 amperes discharge rate we find from Curve B that the available capacity of the battery is 114 ampere hours. The average voltage of 44 cells during a discharge is 83. The available capacity in the battery was $114 \times 83 = 9462$ watt hours. At an expenditure of 229.47 watt hours

round figures 287 watt hours per mile. The average voltage was again 83 and the running speed at the rate of 10.15 miles per hour. By the same process as before we find the average current discharge was 35.1 amperes and by reference to Curve B we find that at this rate our mileage is 31.8. An increase in discharge current of 4.6 amperes is seen to have decreased the mileage practically 9.4 miles.

There are other services within the scope of similar delivery wagons, and a study of variations in mileages under them is also important.

In suburban service, represented by running from New York to Yonkers, where the roads are macadam and hard



FIG. 1. ALTMAN & CO.'S NEW DELIVERY TRUCK.

per mile, we see we have enough capacity to run on the level asphalt, making no stops,

$$\frac{9462}{229.47} = 41.2 \text{ miles.}$$

In order to show mileages of this delivery wagon at all current rates Curve C has been prepared. From it we are able to read graphically the relation to mileage of increases and decreases in current discharge.

As all is not asphalt and there are very few levels, and as city delivery and street traffic conditions are such that we are compelled to stop frequently and accelerate again, our mileage in service cannot be guided by our mileage on the level.

The service of the delivery wagon in question was in New York city, and extended from 134th St. on the north to 3d Avenue on the east, to 8th Avenue on the west and 4th St. on the south. In this service it was found that the same load under good driving skill and the usual conditions of street traffic required in

but hilly, and but few stops are made, it was found that the increase in average current was 17 per cent. over that of level asphalt, or for the wagon in question $30.5 \times 1.17 = 35.7$ amperes.

In country service where the roads were dirt and poor macadam, both soft, hard and in places rough, and the hills frequent, it was found that the current was 22 per cent over that of level asphalt, or for the wagon in question $30.5 \times 1.22 = 37.2$ amperes.

Except in specific cases, as for the delivery wagon described, the energy expenditure per mile must be reduced to a unit. For automobile work, I have found the unit of 1,000 lbs. per mile the most convenient, and I have given this unit the name of "Wattage." Thus on the level asphalt, running straightaway, the delivery wagon ran on 42.3 watt hours per 1,000 lbs. per mile, or a "wattage" of 42.3. The exigencies of city delivery and street traffic increased this "wattage" to 54.5. This means that we were moving .529 lb.-miles at a speed of 10.15 miles per

hour over present New York streets for every watt hour expended.

The vehicle runs on 42-inch diameter driving wheels and 36-inch steering wheels fitted with 2½-inch solid rubber tires. It had a single motor of 82 per cent. efficiency at 40 amperes, and single reduction gearing. With larger wheels, hardened and ground axle bearings, gears housed and running in liquid oil and free from grit, and better street surfaces than at present obtain in New York, there is no reason to doubt that the level asphalt wattage would be nearer 35 than 42.3 and the service wattage in the neighborhood of 43. The resulting gain in mileage would mean much from an operating expense point of view.

The New Altman Delivery Truck.

By Max Loewenthal, E. E.

The firm Altman & Co., a prominent dry goods establishment of New York, have been the pioneers in the metropolis in the use of electric delivery wagons. Their innovation was viewed with much skepticism at the start, which, however, only strengthened their faith in automobile delivery service. They soon found

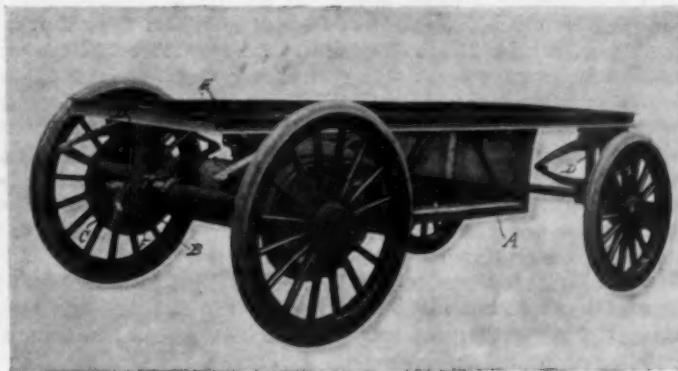


FIG. 2. RUNNING GEAR OF THE ALTMAN DELIVERY TRUCK.

that the wagons had to be of a special design to meet their demands, and they engaged the services of Messrs. F. R. Wood & Son, of New York, to design and build for them a number of special vehicles. One of these, a delivery carriage, was illustrated in our columns last June, and the illustration here given shows their latest development, namely, an electric delivery truck. The truck is to be used for transferring baggage from the smaller delivery wagons coming from downtown to the districts situated above the Harlem river. It is 14 feet in length, weighs 6,000 pounds complete, and has battery capacity enough to propel it over 20 to 30 miles on one charge. There are 44 cells supported in a battery box constructed of channel iron, shown at A, and they may be reached through a trap door in the floor of the vehicle. The entire body of the vehicle is made of 3-in. channel steel. The vehicle is propelled by means of two 2 horse-power Westinghouse electric motors, geared to the rear axle in a ratio of 12 to 128, steel gears

tached to the axles by a flexible connection; but severe twisting strains are inevitably present when two reach-connected axles are obliged to move in different vertical planes. The arrangement shown consists of a pedestal D, which is rigidly connected to the framework E and supports a box F, which carries the axle and is free to move up and down vertically. This new form of connection, which has been patented by Lucius T. Gibbs, has given thorough satisfaction.

The truck is to run at a speed of from 7 to 8 miles per hour and will carry 4 people and a load of 2 tons.

A 12 horse-power touring Panhard recently shown at the Paris exposition has a novel form of body. The driver's seat accommodates three persons, and has before it a glass screen which can be lowered at will. Back of the seat is another glass screen, behind which are two single seats, with a passage between, and another seat for three. The rear of the body is high, and a roof covers it from front to back.

My Experience With Automobile Delivery Wagons.

By W. R. Mabee.*

An automobile to give satisfaction in the delivery of packages in a large department store, where time is the principal factor, should be fitted with a battery which can be readily replaced or be possessed of sufficient power to run the wagon at least forty miles with a load; otherwise the time consumed in charging a battery in the midst of business hours will not permit of making the regular trips on schedule, which is of the utmost importance.

They may be compared to railroad trains in that when once "behind time" it is extremely difficult to "catch up." "On time" is the secret of all successful delivery systems.

One of the principal items to be considered in the use of automobiles is the cost of keeping them in repair. Trouble is occasioned both by careless driving and by the dead weight of the battery causing damage to the machinery and running gear.

Some of the expense to keep the wagon in repair can be eliminated by the employment of capable drivers; I would say, however, that I find out of ten applicants the average is one really successful and capable driver.

Better time can be made with an automobile than with a horse, both in going over and returning from a route and in the delivery of the load. On an average an automobile will do one-half more actual work than the horse.

My experience is that after the weight of the automobile has been reduced, and it can carry a sufficiently large charge for one full day's work, then they will prove highly successful.

An Automobile Show in Washington.

During the week of December 10th an automobile show will be held in Washington, D. C., in the Convention Hall, and will be known as the National Automobile and Sportsman's Show. The hall has a floor space of 36,000 square feet and will contain 110 exhibition spaces. An eight-lap track, 16 feet wide, will be constructed in the hall for demonstration purposes and contests. The exhibition will occur during the week of the National Capitol Centennial celebration, when the social season will be at its height.

Baron P. de Crawhez, chairman of the sporting committee of the Automobile Club of Belgium, will start about December 1st for a motor trip through Biskra and the Sahara. The gasoline tank of his 12-HP. machine, which holds 100 litres, or about 22 gallons, is considered to give a radius of action of 300 miles.

*Supt. Delivery Dept., Siegel-Cooper Co., New York.

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The Club's First Exhibition.

This issue of THE AUTOMOBILE appears on the eve of the first automobile exhibition given in New York under the auspices of the Automobile Club of America, and we have endeavored in these pages to give such information about the club and its work as will constitute this to some degree a souvenir number of the show.

The exhibition now opening bids fair to be the most important and successful one yet devoted to automobilism in this country. The large and representative list of exhibitors, and the wide variety of machines, will make it educational in the highest degree. May it aid much to enlighten the public mind regarding the merits of the new locomotion, and may builders and users alike profit by the opportunity to learn at first hand the best that is being done to perfect the automobile.

More Road Signs Needed.

The Automobile Club of America is doing its full duty in agitating for good roads, and we look confidently for important results from its efforts in this direction. It will be quite a while, however, before good roads are in actual existence everywhere, or even before all the important highways from town to town are in as good condition as economical advantage would require. In the meantime there is urgent need for a complete system of guide posts on all important roads. The Automobile Club of France, where the roads are not a circumstance to those in this country for undesirable features, has made it its business not only to publish road maps and guide books, but to put up signs wherever necessary, indicating the distances and the character of the roads. Why cannot we have both guide books and sign boards in this country? There are surely enough automobilists in the populous centres to make it worth while to take this up at once, and it is the more urgently needed because unridable roads are here so common.

Power For Automobiles.

Extensive experiments have developed the fact that on level, smooth roads power is required at the rate of about 100 watt hours per ton mile for automobile work; but unless the builder is absolutely sure that his vehicle will not travel on other roads than of the smooth asphaltic level variety, he will be very unwise if he limits his power by these conditions. The storage battery and electric motor are respectively capable of delivering and transferring power at a very high rate for a very short period of time, and hence an electrical vehicle pure and simple can approach these conditions quite closely; but if it be attempted to design a steam or gasoline vehicle on this basis of power consumption, trouble will result.

A vehicle weighing 1,500 pounds and with its passengers perhaps one ton, at the rate of 100 watt hours per ton mile, at a speed of 10 miles per hour, will require an average of 1.34 electrical horse-power to drive it, but there are times in that ten miles of running where it may require double or treble this amount for the moment to help it over a rough piece of road or out of a hole; and if the motive equipment is to be rated closely to the smaller figure, it must have an immense overload capacity. This the electric motor and storage battery has, but a gasoline engine overloaded a small percentage above its rating will stop, and a moderate overload will stop the steam engine also. Hence for steam and gasoline vehicles of this weight and speed three and even five horse-power is not an extravagant equipment, and if the vehicle is intended for heavy cross country running, from six to nine horse-power will be found good practice. It is a serious mistake to have too little power; a much lesser one is to have too much.

Road and Track Racing.

The need of reasonable consideration on the part of automobilists in the matter of speed is a thing that cannot too often be insisted on. Both on account of runaways of horses and because of the apparent danger to pedestrians, the public sentiment aroused by the apparent disregard of others' rights on the road is very apt to find expression in legislation quite unnecessarily oppressive. That horses must and will learn to face the machines, and that the public itself will learn that the automobile is under far better control than appears, do not alter the case. At present, and until these machines cease to be a novelty, it is a condition and not a theory that confronts us.

In some quarters there is a disposition to regard this condition as absolutely incompatible with road racing. This seems to us a mistake. It does, indeed, render racing on the road by irresponsible individuals an unmitigated nuisance and a detriment to the industry. But is it not possible, by suitable restrictions, to avoid the odium and get the benefit of racing? In France every race is conducted by a responsible club, official permission is secured for it, and notices are placarded along the route, announcing at what time the racers may be expected to pass and cautioning all users of the road to keep to a given side. Where necessary the route is policed, and slow speed through towns is enjoined by the rules of the race.

There are not many roads in this country outside of the cities on which races could be held, nor are there at present many clubs to organize such races; but it does not seem impossible that road races could be organized under regula-

tions similar to the above without injury to other users of the highway. It will hardly be seriously claimed that track racing is an adequate substitute, or even a substitute in any sense, for road racing. The remarks of Mr. Albert C. Bostwick, in the report of the Automobile Club of America's Committee on Runs and Tours, bring out this point very forcibly. The natural tendency of track racing will be to produce a lot of whirligigs fit for nothing but to spin around a board circle, and bearing little or no relation to vehicles for the road. Until the public understands the difference, it will demand unreasonable things of its road machines, and when the difference is grasped the track racer will be regarded only by the professional "sports."

The Value of Auxiliary Brakes.

The brief paragraph published elsewhere in this issue regarding the tour of the Automobile Club of Great Britain last month, and the nearly universal difficulty with brakes experienced on descending a particular hill, suggests that this is a point in which most American automobiles are notably deficient. The steepest grade of Birdlip Hill is given as one in seven, and all the machines involved had at least two different braking systems, one acting on the countershaft and the other on the rear wheel brake drums. Some machines even had brakes acting on the tires, and in every case we believe all the brakes available were applied together. Such was the length of the hill, however, that the machines getting to the bottom with the brakes in condition for further service were the exception, and most of the brake bands were entirely burned out.

It is evidently one thing to have a brake which will stop the machine, let us say, within its own length or double its length at full speed, and another thing entirely to have a brake in which the heat generated is sufficiently distributed and conducted away rapidly enough to endure a long descent. We presume that the brakes on any of the American machines would fulfill the former condition, but it may be questioned whether it is not a serious mistake, in the interest of simplicity or a fancied economy, to omit the auxiliary brake system which is universal abroad. There is more involved than simply having a brake that will stop the carriage quickly enough, or even having one that will not break down.

In the program of events at the show it was intended to include obstacle and stopping and starting contests between electric cabs, but it was feared by the managers of the electric liveries that this would prompt the drivers of these machines to practice "stunts" on the streets, and this project was therefore abandoned.

The Relation of the State to the Good Roads Movement.

By A. R. Shattuck

In previous years in the state of New York the state appropriated the sum of \$50,000 a year to be spent as aid in building and improving the highways in this state.

This year the state increased that appropriation to \$150,000, which means an expenditure of the building of new roads of \$300,000, because under the existing law, viz.: the Higbee & Armstrong law, the state pays half the cost of the new roads, the county 35 per cent. and the individual property owner benefited by the road 15 per cent.

Because of this increased appropriation the state engineer has been enabled during the present summer to build about 25 miles of new stone road, 10 of which are located in the county of Westchester. It has been estimated that over \$3,000,000 are annually spent in this state in improving and caring for our roads. Most of this sum is wasted because it is spent in day's labor by the farmers who work out their taxes on the roads. A small part of it, however, is expended in money; only about \$250,000.

Under the Fuller Act, passed in 1898, the state agreed to rebate 25 per cent. of the taxes of any town which would adopt the money system in preference to the day's labor system. Last year under this law the state rebated taxes to the amount of about \$52,000. Any town which chooses to give up the labor system can do so and get back from the state 25 per cent. of its road taxes, besides which, with money, far better work can be done upon the roads than under the old and antiquated methods of working out the road taxes by day's labor.

The state of Massachusetts some years ago abandoned the system of working out the road tax by day's labor. The entire road tax is collected in money and intelligently spent. Besides this the state of Massachusetts spends half a million dollars a year in building excellent roads.

It is to be hoped that the citizens of the state of New York will soon see what a mistake they are making in caring for their roads, and that they will ultimately abandon, as many other states have done, the plan of working out the road tax by means of day's labor.

An unusual method of cooling the jacket water is that employed in the Canella-Durkopp vehicles, made in Germany. A cooling tank 22 inches deep, 18 inches long, and 5 inches wide, is placed crosswise in the front of the frame. Between its sides are 1,200 $\frac{1}{4}$ -inch tubes, through which air is drawn by a fan on the motor shaft. From this cooling tank the water is returned to the main tank by a centrifugal pump.

The Choice of Systems.

By Herbert L. Towle.

The first question of the layman, perplexed by the apparently conflicting claims of the electric, steam and gasoline carriage builders, is usually, "Which motive system is really the best?" This, however, is much like asking which is the best breed of horse; for the answer will depend in large measure on what the vehicle is to be used for, and to some degree also on the personal equation of the user.

The character and scope of the electric vehicle are now quite generally understood. Mechanically speaking, it is almost simplicity itself. A running gear, with a motor or two motors geared by single reduction to the rear axle or wheels; a controller; at the most a differential gear—there is hardly machinery enough to claim the title. The rest is battery; but in importance this is nine-tenths of the whole. The electric carriage, as usually equipped, cannot go more than ten or fifteen miles from a charging station, if the roads be good, or much less if they be bad. It can be forced, by hill climbing or high speed, to double or treble its normal power; but forced discharges mean rapid and costly disintegration of the plate. Too rapid charging has the same effect, and it is impracticable to charge and discharge the battery more than twice per day. Frequent starting and stopping drains the stored energy very quickly, and rough roads compel frequent repairs. Every day or two, if the carriage is in constant use, the battery must be tested, cell by cell, to see that each delivers its full voltage and that the acid solution is of the proper density.

In a word, the electric carriage is suited only for local use in cities and their immediate suburbs, where it is never called upon to do hard work. On the other hand, its ideal simplicity as regards management, its absolute safety, and its freedom from objectionable noise and vibration, make it the urban pleasure vehicle par excellence. It costs more to run than the gasoline or steam vehicles, and battery repairs, when necessary, are not cheap, but on asphalted pavement neither of these drawbacks can be called important.

If, however, the prospective owner of a carriage meditates more extensive explorations and higher speeds than his afternoon constitutional will permit, he must perforce accept one of the prime movers for his propulsion, and accept its drawbacks for the sake of the greater freedom it affords. The controversy as to the relative merits of steam and gasoline motors has been active during the past year, and there are no signs of an immediate settlement. Certain facts, however, may be set down. The steam carriage may be, and usually is, of very much lighter construction than its rival. This is largely necessitated by the greater consumption of gasoline in

THE AUTOMOBILE.

the former, a steam carriage using fully double as much fuel as a gasoline run-about; but it is facilitated also by the small weight of the steam engine and boiler as compared with the explosion motor and its transmission gear. For the above reasons comparatively few steam carriages, using gasoline for fuel, are built to stand severe usage. In small sizes the gasoline vehicle motor is a difficult problem, and one which has been as yet but imperfectly solved in this country. The small steam motor, on the other hand, is at least not "cranky," and this has given it a decided advantage. But there is no great difficulty in producing a reliable gas engine of, say, ten-horse power; and the carriage with such a motor, even if the rig weigh 1,600 pounds, will cost less to run than a steam carriage weighing 500 pounds, and it will endure many times the rough handling.

The light steam carriage, therefore, occupies in the above respect what may be considered a middle position between the electric and the heavy gasoline carriage, and the large sale which it has found testifies to how well it fills its field. It can be used for touring; but where continued high speeds are to be maintained over all sorts of roads, there is, in the writer's opinion, no substitute for the liberally powered gasoline machine.

If a practical kerosene burner for carriages should be produced before the kerosene explosion motor is perfected for vehicle service, a high-powered steam touring machine can be built which will run its rival hard; but until then the above remarks are broadly applicable to the three respective systems, and there seems little likelihood of the situation being changed. There is every indication, however, that the light gasoline carriage, whose struggling infancy has here gone down rather easily before the less esoteric steam vehicle, will soon be so far perfected as to challenge respectful consideration. When this occurs the two systems will stand on an equal footing, and the question will then arise: Which is the better for a light carriage?

Here again the writer believes that no categorical reply can be made. There will be no great difference as regards expense, for if the steam carriage costs more to run it costs less to buy. The steam boiler and burner will always have an element of danger, and the gasoline vehicle will always require more intelligent handling. The steam engine is a more flexible motor than the gasoline engine is ever likely to be, and this is an important advantage. On the other hand, the boiler cannot fail to be troublesome where the feed water is hard, and in some sections of the country this may well be the deciding factor. In very many cases the "personal equation" will determine the choice, since the steam engine and the gas engine, being so different in themselves, will appeal to different minds.

Albert C. Bostwick's Racer.

We show on this page an illustration from a recent photograph of Mr. Albert C. Bostwick's well-known racing machine, which is to be exhibited at the Madison Square Garden Show. As our readers know, this machine was built by Panhard & Levassor for René de Knyff, who is known in France as "the king of automobilists." As a racing machine, it had a great deal of special work and attention given it, although it conforms to the general Panhard design. Its four-cylinder motor develops 24 h. p. and can be

The Gasoline Vehicle Engine.—V.

E. W. Roberts, M. E.

Next in importance to having a properly regulated and reliable ignition device is to have an engine so designed and constructed that very little damage is likely to occur to the piston or to the cylinder. In any gas engine a leaky piston is productive of much annoyance, as the engine will lose compression and drop off in power in consequence of this loss. In stationary gas engine practice a water jacket is always cast in the cylinder wall, and this is kept full of water in order to



ALBERT C. BOSTWICK'S PANHARD RACER.

speeded to about 1,500 turns per minute. The transmission gear is directly under the seat and contains the usual four speeds and bevel gear reverse. The use of a countershaft containing the differential, enabling as it does the rear wheels to be driven independently and doing away with the divided rear axle, is almost indispensable in a machine of this power and speed. The usual three levers are at the operator's right hand, and the clutch is disconnected by a pedal under the left foot, while the right foot works a pedal which disconnects the clutch and also applies brakes to the rear wheels. The left hand is used to guide the machine, the right hand being free. The body is made of aluminum instead of wood.

The most notable events won by de Knyff in this car were the Nice to Marseilles race, and the "Tour de France." Mr. Bostwick, in his first race with it in France, drove 116 kilometers in 1 h. 31 min., or at the rate of 43 miles per hour. That was in the Bordeaux-Perigueux race. In this country, on the Guttenburg mile track, he succeeded in doing five miles in 7 min. 42 sec., and 10 miles in 15 min. 9 sec., and his best mile was made in 1 min. 27 3-5 sec.

prevent undue heating of the cylinder or the piston, particularly on the rubbing surfaces. This is absolutely necessary for the reason that the temperature of the gases at the moment of explosion is equal to that of molten steel.

A great number of small automobile engines employ cooling flanges cast upon

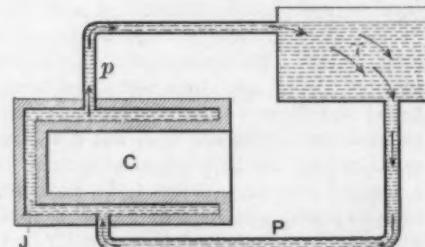


FIG. 10.

the cylinder, or slipped on in the form of rings, in order to produce a large radiating surface, so that the heat given off to the cylinder wall may be carried away by the surrounding air. Cooling flanges are seldom applied to engines having an interior cylinder diameter of over 3½ inches. The writer's experience does not uphold their use for two-cycle engines. When these engines reach a high speed, heat is generated so rapidly that it does not seem

to be carried off in sufficient quantities by flange radiation. In engines larger than $3\frac{1}{2}$ inches bore, it is customary to use a water jacket.

Flange-cooled engines should always be placed in such a position on the carriage

rider was going with the wind, it was found that the power of the engine would fall off considerably. The cause of this trouble was traced to an overheated cylinder. The falling off in power was evidently due to added friction and possibly

C represents the cylinder, with water-jacket J connected by the pipes p and P to the tank T, which is usually placed higher than the engine. The heat that reaches the water raises the temperature in the jacket, and the hot water rises to the top of the tank. Then it mixes with the water in the tank, and, becoming cooler, passes out through the pipe P back to the jacket to take the place of the hot water rising through the pipe p. Although the heat of the engine will keep up a continuous circulation, the rate of flow grows less as the water in the tank T gets hotter. Some automobiles are, for this reason, provided with a circulating pump placed in one of the conducting pipes.

In connecting up a system of this kind it is quite important to so arrange it that the water enters at the lowest point and leaves at the highest point of the jacket. If this is not done there is likely to be some inactive water in the bottom of the jacket, but the greatest danger lies in making a pocket in the top of the jacket where steam will collect and the contiguous parts of the cylinder will be overheated.

In some of the earlier designs there was no arrangement for cooling the water in the tank by means of air currents; and the water was allowed to come to the boiling point and gradually evaporate, necessitating carrying a large quantity of water and frequent replenishing. Later the water tanks were made in a manner similar to a steam boiler with tubes passing through them, as shown in Fig. 11. Two varieties of these tanks are shown



ELECTRIC BUS ON RIVERSIDE DRIVE, NEW YORK.

that the cylinders will be exposed to the air currents produced by the motion of the carriage. These air currents constitute the breeze which the rider always feels when riding, even in a calm. The

to rarefaction of the charge. Overheated cylinders are also very likely to cause premature ignition; and this early firing will not only reduce the power of the engine, but very often bring it to a dead



A. R. SHATTUCK'S 5-H.P. "MOTORETTE."



C. J. FIELD IN HIS "MOTORETTE."

SOME NEW AUTOMOBILES IN NEW YORK.

excessively hot summer just passed has been a trying one for the flange-cooled engine, and many complaints have been made by their users that the flanges would not do the work required of them. On an extremely hot day, especially when the

stop. In ordinary weather, however, the small flange-cooled engine works very nicely, and saves carrying water, and the accompanying weight and attention.

Water-jacketed vehicle engines are usually connected up as shown in Fig. 10:

in the figure. The tank A is arranged with tubes very nearly vertical, but having a slight slope towards the rear of the carriage. The sloping tubes catch the air, forcing it to pass through them; and sometimes, but not always, a shield S is

provided to assist in directing the air through the tubes. In the tank B the tubes are horizontal, their axes being in line with the direction of travel of the carriage. The front ends of the tubes are in some cases provided with flaring mouths, as shown at F.

In Fig. 12 is illustrated another method of cooling the water. This is to use a series of pipes with flanges to increase the radiating surface. Formerly these pipes were of cast metal, as shown at C in the figure, but owing to the weight

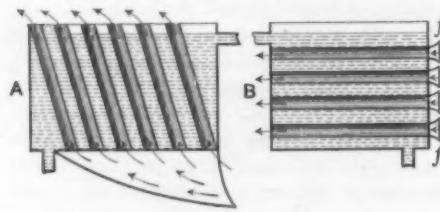


FIG. 11.

of this form of pipe, copper tubing with sheet iron or aluminum fins is now used instead. These fins, square or circular in form, are stamped as follows: Two cuts are made in the centre, as shown at E, crossing each other. The points made by the cuts are then bent outwardly, as shown at H and I, making a circular aperture for the introduction of the tube (see D). Next they are strung on the tube, the points serving to space them and also to grip the tube.

Before stringing the fins, the tube is bent zig-zag, so as to get the largest pos-

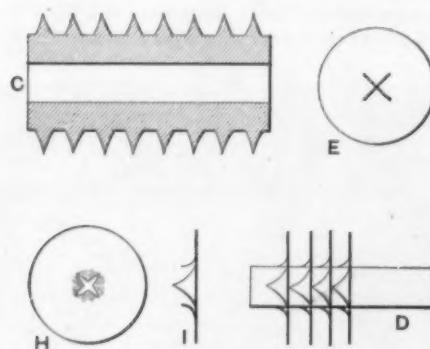


FIG. 12.

sible radiating surface in a given space. By using these radiators the temperature of the water in the tank is always kept below the boiling point, and the amount of water necessary for a day's journey is very small.

A rapid circulation is desirable when radiators are used, and in European practice, where they are considered indispensable, a circulating pump is nearly always used, the gravity system being considered too sluggish.

In Jersey City, N. J., the boulevard commissioners have adopted a series of rules governing the use of automobiles on the boulevards of that city. The speed is limited to 12 miles an hour, and bells and lamps must be carried

Club News and Views.

Club Directory.

Automobile Club of America, Malcolm W. Ford, Secy., 203 Broadway, New York.

Automobile Club of Baltimore, W. W. Donaldson, Secy., 872 Park Ave., Baltimore.

Chicago Automobile Club, Chas. T. Jeffery, Secy., Chicago, Ill.

Automobile Club of Columbus, C. M. Chittenden, Secy., Broad St., Columbus, O.

Automobile Club of Rochester, Fredk. Sager, Secy., 66 East Ave., Rochester, N. Y.

Buffalo Automobile Club, Geo. S. Metcalf, Secy., Buffalo, N. Y.

Cleveland Automobile Club, L. H. Rogers, Secy., Cleveland, O.

Columbia College Automobile Club, Lewis Iselin, Secy., Col. College, New York.

Essex Co. Automobile Club, Dr. H. Power, Secy., Upper Montclair, N. J.

Long Island Automobile Club, C. W. Spurr, Secy., 980 St. Mark's Ave., Brooklyn.

North Jersey Automobile Club, E. T. Bell, Jr., Secy., Paterson, N. J.

Philadelphia Automobile Club, Frank C. Lewin, Secy., Hotel Flanders, Phila., Pa.

Pennsylvania Automobile Club, Henry J. Johnson, Secy., Philadelphia, Pa.

San Francisco Automobile Club, B. L. Ryder, Secy., San Francisco, Cal.

Worcester Automobile Club, Harry F. Knight, Secy. and Treas., Worcester, Mass.

& N. J. Telephone Co., and H. S. Chapin, with the J. Walter Thompson Advertising Co., of Rockville Centre, L. I. Articles of incorporation were drawn up, and all automobileists of Brooklyn and Long Island are invited to join the club.

Autumn Tour of the Automobile Club of Great Britain.

The Automobile Club of Great Britain held its autumn tour on October 5th to 9th, the route extending from the start at Whitehall Court, London, through Hounslow, Wallingford, Cirencester, to Monmouth. Sunday was spent quietly in the last-named town, and the return was made via Cheltenham and Oxford. Birdlip Hill, one of the most dangerous descents in the country, was negotiated, with numerous burned brake bands and one or two broken ones, the latter causing the smash-up of a Peugeot violette. Fortunately no one was injured.

Mr. J. Dunbar Wright, second vice-president of the Automobile Club of America, retired from business in 1898 and has spent most of the time since in traveling. He spent some time in Paris last summer and saw the finish of the Gordon-Bennett race, and has ridden on some of the fastest machines over there. His own machine is a nine h. p. Winton, on which he has made some long runs, one from New York to Utica, 280 miles, and the most recent from Newport to New York, 258 miles.

The Moto Club of France has moved into its premises at 4 Rue Meyerbeer, Paris. A new work with which the club has charged itself is the putting up of sign-boards marking the location of caniveaux, the paved water courses which, crossing the roads at unexpected points, now render high speed so dangerous in France.

The Grand Central Palace Show.

Marcus Nathan, manager of the automobile show, to be held at the Grand Central Palace, New York, Nov. 14-24, announces that more space has already been sold for that event than is available in the entire amphitheatre of the Madison Square Garden. Mr. Nathan points out that the Horse Show, which is often considered as marking the opening of the season in New York, occurs at the same time, and that the show takes place after the excitement of the campaign is over. There seems no reason to doubt that there will be a large attendance of the "best people" at this show as well as at that in Madison Square Garden.

A Long Island Club Formed.

The Long Island Automobile Club was organized on October 18, with the purpose of advancing the good roads movement on Long Island, defending the road rights of its members, promoting good-will between horse drivers and motorists and the advancement of automobiling as a pastime and sport. The following officers were elected: President, L. R. Adams, 102 Flatbush Ave., President of the No Match Gas Lighting Co.; Vice-President, Robert Darling, U. S. Battery Co.; Secretary, C. W. Spurr, 980 St. Mark's Ave., lawyer; Treasurer, Frank G. Webb, of the N. Y. & N. J. Telephone Co.

Seven directors were chosen, these being the above four officers of the club, and in addition three others—Jas. C. Church, lawyer; A. R. Pardington, with the N. Y.

Correspondence.

Space will be given on this page to letters concerning the Automobile, its operation or construction, to accounts of tours or runs, routes of travel, good roads, etc. When requested by correspondents their names will not be published, but must always be given in the communication to the Editor.

Power Formulas Wanted.

Editor THE AUTOMOBILE:

I have watched with much interest the articles in your paper on Gasoline Engines, and would like to ask what rule is followed in figuring the power of gas engines; also what is the difference in figuring the power of the two and four cycle type, and which you consider the better engine for an automobile?

INQUIRER.

Williamsport, Pa., Oct. 26.

Making the Engine do the Pumping.

Editor THE AUTOMOBILE:

I have a steam buggy which has given good service during the past year. Where the roads are very good the pump will supply water a little too fast and then a part may be returned to the tank by the by-pass. But over muddy roads, and especially up hills, steam is used faster than the pump will furnish water, and the operator is rendered mentally uncomfortable in making hills when the water is out of sight in the water glass. The new makes of steam buggies have a hand pump to overcome this difficulty, although I had supposed there was plenty of hand pumping to do already in keeping air pressure. My own method, when the water is low in the boiler, is to raise one rear wheel by a jack or in any other convenient manner. The engine will then turn the wheel by the compensating gear without moving the buggy, and at the expense of very little steam the water may be pumped into the boiler to any amount in a very few minutes. C. H. MAYO.

Rochester, Minn., Oct. 10.

A Military "Mobile" Promised.

Mr. John Brisben Walker, president of The "Mobile" Co. of America, has written to the Secretary of War, offering to send to Washington, without expense to the War Department, the new Military Mobile, a model of which will be on exhibition at the Madison Square Roof Garden during the show of the Automobile Club.

He guarantees the machine to carry 1,000 rounds of ammunition, 4 riflemen, 4 rifles, 2 intrenching shovels, food for four men for three days, 4 pairs of blankets, 2 rubber shelters reaching down from the sides of the machine, and enough oil to cover 200 miles. The machine to cover 100 miles from sun-up to sunset, over the average country roads or unbroken prairies of Colorado and Nebraska.

This "unit of fours" embraces all the requisites of the Quartermaster's Department, the Commissary Department, the

Ordnance Bureau, and Cavalry Bureau. It has a movement more than five times as great as that of the average infantry corps, and more than twice as great as the average of cavalry.

A distinguished officer said to Mr. Walker recently: "If you can substantiate the claims made for your military machine, it will have revolutionized the

of Lord Carnarvon, Count Zborowski, Mark Mayhew, and the Hon. C. S. Rolls, respectively.

The "Lancamobile."

One of the features of the "Lancamobile," built by James H. Lancaster & Co., 95 to 97 Liberty St., New York, is an independent air motor to start the gasoline motor. When the latter is



THE "LANCAMOBILE."

art of war. A force of 20,000 men so quickly can strike a force of 100,000 at such unexpected places as to place them at such disadvantage as to leave victory always with the lesser army."

It is reported that four Napier's of 50 horse-power are being built to the order

running the air motor becomes a compressor, and stores air in the tubular frame of the vehicle. The gasoline motor has two cylinders and develops 7 HP. at 700 revolutions. There are three forward speeds, by gearing and controlled by a single lever, and one reverse. The lubrication of engine and transmission gears is automatic. The vehicle has two main seats, the rear of which may be placed to face forwards or dos-a-dos, and a small vis-a-vis front seat for children.

There may be other self-propelled vehicles which meet your demand for an ideal automobile, but we would like the privilege of writing you

how and why this particular one gives all pleasure and no annoyance—before you make a purchase.

MAY WE?

PRICES
With top, \$1000
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Waltham Mfg. Co.

Waltham,
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Bicycles,
Motor Bicycles,
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THE AUTOMOBILE.

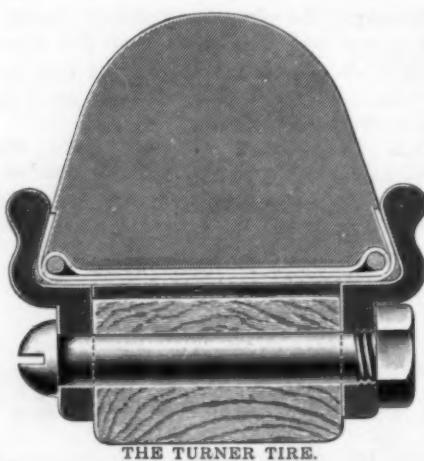
NEW APPLIANCES.

THE TURNER TIRE.

The Hartford Rubber Works, Hartford, Conn., are making a new endless solid tire, which they call the Turner Tire, and which is illustrated herewith. The tire is secured at its perimeter by the endless wires shown, and in addition it is vulcanized in a mould which ensures a perfect fit. The flanges bolted to the wood felloe are formed with an angle which fits the sloping sides of the tire, and when in place these flanges compress the tire so that creeping or pulling off is claimed to be practically impossible.

THE "REGAS" MOTOR CYCLE.

A motor bicycle with several interesting features has just been brought out by the "Regas" Vehicle Co., Rochester, N. Y. The motor, which will be of $1\frac{1}{4}$ horse-power, is placed as low as possible in the frame. It is air-cooled, and the gasoline supply is said to be sufficient for seventy-five miles. The frame of the machine is so



THE TURNER TIRE.



The Automobile, N.Y.

arranged that it can be converted into a tricycle with either two rear or two front wheels, as preferred.

The manufacturers propose to deal not only in the complete machine, but any of its parts, and to permit bicycle manufacturers to make it on royalty.

A CONVENIENT BATTERY HYDROMETER.

As every electric carriage owner knows, it is necessary to test the density of the acid solution frequently to keep the battery in proper order. To do this with a covered cell is sometimes an awkward operation, and it is to simplify and expedite this necessary test that the device illustrated is made. It consists of an ordinary hydrometer enclosed in a large pipette with a rubber bulb for filling it. To test the density of the electrolyte, the bulb is compressed and the nozzle introduced into the solution through the hole in the cover. On releasing the bulb, the fluid rises and floats the hydrometer. The reading is made, the acid returned to the cell, and the process is repeated for each cell in succession. As there is no transferring of acid from one vessel to another, the operation is perfectly cleanly.

An additional nozzle is furnished for filling the cells with electrolyte to their proper level. The syringe is filled from the supply vessel, the nozzle is rested on the tops of the plates, and by compressing and releasing the bulb the excess is withdrawn and the proper amount left above the plates.

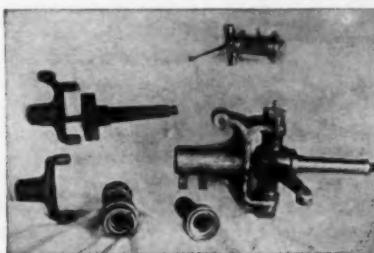
The instrument is called the "Hydrometer Syringe" by its makers and patentees. The Storage Battery Supply Co., of 239 East 27th St., New York City. It is provided with both specific gravity and Baume scales, and full directions for each use are supplied with each instrument.



PATENTED 1898.

MACHINERY PARTS SUPPLIED.

The Conrad Motor Carriage Co., who build steam runabouts, phaetons and delivery wagons, handle also running gears ready for the machinery equipment, and are prepared to supply



any of the parts thereof, either machined or in the rough, to the trade. The illustration shows their various sizes of steering knuckles for light and heavy vehicles.

Walter H Foster

126 Liberty St., New York

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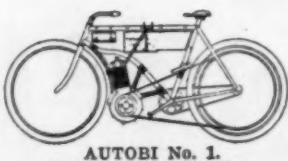
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AUTOBI No. 1.
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Light Roadster. Pat. Pending.

Each agent and manufacturer should order samples at once, and familiarize himself with Motor Cycles in time to care for the immense demand already upon us.

PARTS AND ACCESSORIES

Our supply department is the most complete in the country. We carry the best of everything for the Motor Cycle Builder. Aluminum crank and gear cases, spur gears, compensating gears, friction clutches, carburetors, mufflers, induction coils, batteries, sparking plugs, levers and brackets, lamps, bells, etc., etc. Blue prints of any of our vehicles furnished to Motor purchasers.

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An Ideal Roadster.
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particulars as usually
furnished to manu-
facturers

AUTOTWO.
An Ideal Roadster for Two.
Pat. Pending.

E. R. Thomas Motor Co. 105 Broadway, Buffalo, N. Y.

A NEW GRADE INDICATOR.

The Adams Company, Dubuque, Ia., has just put on the market a neat and simple appliance for indicating at any time the grade on which a vehicle is travelling. It consists of a nickel-plated casing, 6 inches long, containing a curved glass tube filled with spirits, leaving a small bubble like that of a spirit level. The casing is graduated, and will read to 30 per cent. grades either way from the centre.



The advantage of the spirit level for the purpose of indicating grades when in motion is that it is practically unaffected by the jolting of the vehicle, a feature the lack of which renders any pendulum or similar mechanical device so unsatisfactory.

The Adams Co. calls its device the "Gradometer." The illustration shows it attached to the side of a stanhope carriage.

A COMPACT FOOT WARMER.

The Lehman foot warmer, shown in the illustration, is a neat solution of the problem of keep-



ing the feet warm when driving in cold weather. It takes up little space and is economical to use. The makers, Lehman Bros., 10 Bond St., New York, send descriptive matter on request.

Business News.

The Cleveland Machine Screw Co., Cleveland, O., was awarded a gold medal for its electric vehicles at the Paris Exposition.

Gray & Davis, Amesbury, Mass., send us a neat pamphlet showing the different types of stylish carriage lamps of their manufacture. Oil and candle lamps predominate, but electric and acetylene lamps are also found.

The Strathmore Automobile Co., Boston, Mass., has completed arrangements for the lease of a new factory at North Cambridge, containing four floors and affording ample facilities for the manufacture, storage, and repair of automobiles. The management of the company has recently been changed. The Boston office is centrally located at No. 1 Beacon St.

The prize of £10 offered by the "London Daily Mail" was awarded to the Locomobile in addition to the prize awarded by the Automobile Club of Great Britain of £15 in the recent 1,000-mile test. In a recent letter to the Locomobile Co. of America the Baroness Campbell writes as follows: "If you have not already heard it, I am sure you will be pleased to learn that General Slade has reported to the English Government that in the trials of the motors at the German Manoeuvres over ploughed fields, grass and bad roads, the "Stanley," as they call it, was the first and only car entered in the trials."

The Locomobile Co. of America recently opened a branch in Buffalo, where it has secured a magnificent fire-proof building. The location is on the main street of the city and is especially fitted for handling locomobiles. The basement is connected with the street in the rear by a commodious runway where carriages may be brought in, run on to a cement washstand and cleaned, after which a convenient elevator raises them to the floor desired. The first floor consists of show room, office, and stock room, where a complete line of parts is always kept on hand. The second and third floors are used for the storage of vehicles, and the fourth floor contains a repair department. Mr. F. W. Peckham, who was in charge of the company's branch at Newport the past summer and through whose efforts the Newport automobile races were held, is in charge of the branch.

THE LIFE OF AN AUTOMOBILE.

The easy working of the parts and the comfort of the driver

Largely Depends Upon Perfect Lubrication.

Dixon's Pure Flake Graphite Is the only lubricant that can withstand the heat in a gas-engine cylinder. Pure flake graphite perfectly lubricates motor cylinders and all working parts. We prepare Special Lubricants for Gears of Electric Motors and Special Lubricants for Chains of Motor Vehicles. Correspondence solicited. Samples free to responsible parties.

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HARTFORD TIRES for any class of vehicles, from a light speeding wagon to the heaviest automobile, are the most satisfactory tires on the market, because they can be depended upon.

The rubber is of the finest quality, tough and durable, the fabric strong, yet elastic.

In buying automobile or carriage tires, their reputation for quality and durability should be more considered than the first cost.

In the long run it is most economical to purchase the best.

FOR SPEED, COMFORT and DURABILITY,

HARTFORD TIRES
ARE UNEXCELLED BY ANY OTHER TIRE MADE.

Give Your Customers the BEST.

Our reputation will not permit of our making any inferior article.

The Hartford Rubber Works Co., Hartford, Conn.

GENERAL MACHINISTS

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AUTOMOBILE WORK A SPECIALTY.

HYDRAULIC FORGING IN IRON AND STEEL

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"Bevin" Automobile Bell

Two Sizes
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Unique in Construction. Most Pleasing in Tone. Easily Attached to Any Vehicle. Insist on Having the Right Thing.

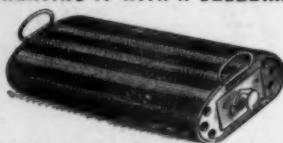
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BY HEATING IT WITH A CELEBRATED

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Descriptive Circular for the asking LEHMAN BROS., Mfrs., 10 Bond St., New York

Motor-Vehicle Repair and Storage Co.

7 East 28th St., New York

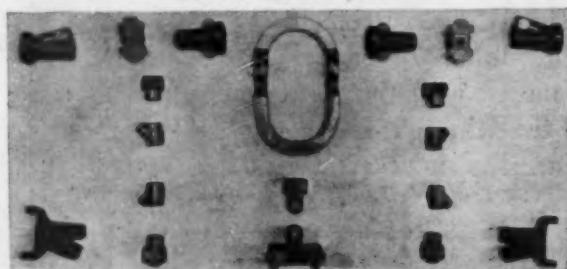
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Complete mechanical equipment and competent employees to undertake all Automobile repairs.

Exhibitors at the Show will find us close at hand where they can be accommodated with housing and supplies.



We are now prepared to furnish promptly light running gears complete, also frame fittings in the rough and machined

THE CONRAD MOTOR CARRIAGE COMPANY

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GEARS GEARS GEARS



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Patents.

List of Automobile patents granted during month of October.

- 659,557—Pneumatic tire for vehicles. Issued to U. P. Smith.
- 659,589—Pneumatic tire for wheels. Issued to R. J. C. Mitchell.
- 659,590—Rubber tire. Issued to J. L. Connable.
- 659,590—Truck for autocars. Issued to A. Muhlbach.
- 659,598—Motor vehicles. Issued to E. Bernardi.
- 659,581—Motor vehicle. Issued to A. M. Coburn.
- 659,318—Motor vehicle. Issued to G. T. Pillings.
- 659,222—Self-propelled vehicle. Issued to C. H. Foster.
- 659,729—Control apparatus for electric carriages. Issued to H. F. Eaton.
- 659,956—Motor cycle. Issued to L. & A. Chapelle.
- 659,701—Pneumatic tire. Issued to R. P. Scott.
- 659,920—Rubber tire. Issued to A. W. Grant.
- 659,673—Air admission and check valve for pneumatic tires. Issued to E. W. Holt.

If you are interested in what Automobilists should wear—Master or man—we can interest you.

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THE AUTOMOBILE,

150 Nassau Street, New York.

Small Engines and Boilers.

By EGBERT P. WATSON.

12mo., cloth, 30 full-page working drawings.

Price, \$1.25.

A manual of concise and specific direction for the construction of small steam engines and boilers from 5 horse-power down to model size.



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BIKE WAGONS
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BRANCHES.

215 West 53rd Street, - New York City.
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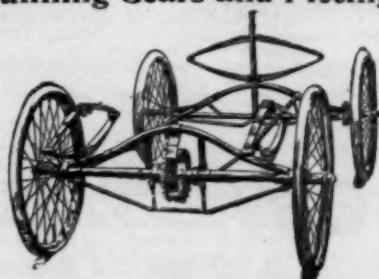
Portable Rheostats

which enable you to charge your storage batteries from any Edison station or trolley station, while touring.

Also equipments for private stables and for charging stables.

Iron Clad Resistance Co., Westfield, N. J.

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If you intend building Automobiles
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Voltmeters

for testing storage batteries.

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for testing primary batteries. Indispensable for ascertaining the condition of batteries.

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CONSOLIDATED RUBBER TIRE CO.
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We Make, Rent, Recharge and Repair Storage Batteries.

THE STORAGE BATTERY SUPPLY COMPANY,

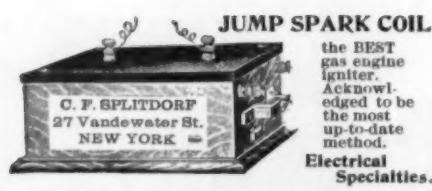
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Pop Safety Valves,
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Cocks for **Steam Vehicles**

THE ASHTON VALVE CO.

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"MOBILE"

"WESTCHESTER MODEL"
Immediate Deliveries

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Manufacturers of Gaso-
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AUTOMOBILES STORED and REPAIRED

UPTON TRANSMISSION GEAR

At Last

Here is a **PERFECT**
Gear for all classes of
motor carriages.

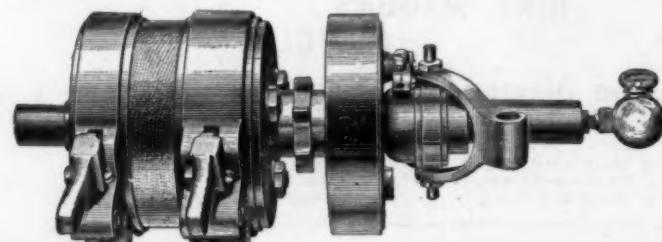
There is nothing that approaches the Upton Gear in speed, control, durability and general efficiency. It is superior to all others.

ABSOLUTELY DUST PROOF

The Upton Gear may be easily adapted to any kind of gasoline, steam or electric motor vehicle. It has two speeds and reverse. Change of speeds is affected by brakes, and the ratio may be arranged as desired. The shaft is in one piece and may be driven direct from motor shaft. The left hand brake operates the reverse which is at slow speed. The brake next to it operates the slow speed ahead. The sprocket drives the axle. The friction clutch at the right locks the whole system and drives it at the speed of the shaft. It has an automatic oiler. The neatest, strongest and most compact gear yet produced.

Every manufacturer and all owners of motor vehicles should examine and test the Upton Gear carefully.

Two Sizes—No. 1, 4 to 5 HP., 35 lbs. No. 2, 7 to 8 HP., 43 lbs.



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These people are all keenly interested in Automobiles, they will be anxious to compare the newest Motor Vehicles with the newest rigs shown at the Horse Show.

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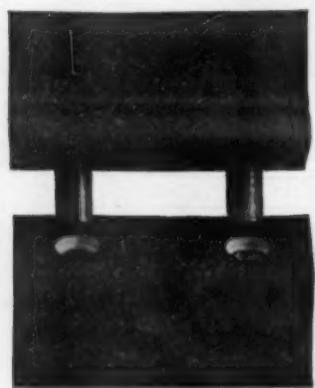
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(Horse Show Period)

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They come from Boston, they come from
Philadelphia, they come from Albany,
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For Electric Automobiles

MANUFACTURER of all kinds
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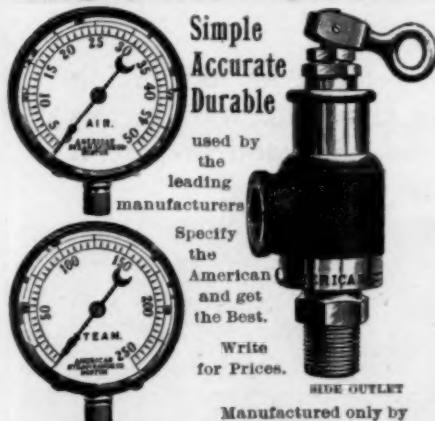
ENGINES, Boilers, Regulators, Burners, Gauges and Valves. Also a full line of Steam Vehicle Fittings &

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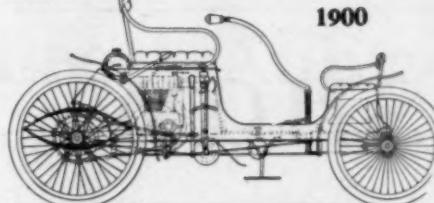


American Steam Gauge Co., Boston
NEW YORK CHICAGO

"LANCAMOBILES"

Special Motor Carriages, Delivery, Tourist and Mail Wagons; also Gasoline Launches of every Style and Size Promptly Designed and Built to order.

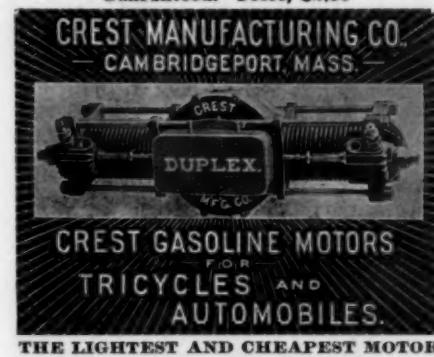
1900



LANCAMOBILES—Ideal Auto-Vehicles.
LANCAMOBILES—Triumphant gasoline-operated carriages par excellence.
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James H. Lancaster Co., 95-97 Liberty St., New York, U.S.A.

Crest Indestructible Sparking Plugs
Guaranteed. Price, \$2.00



THE LIGHTEST AND CHEAPEST MOTOR
PER HORSE POWER MADE.



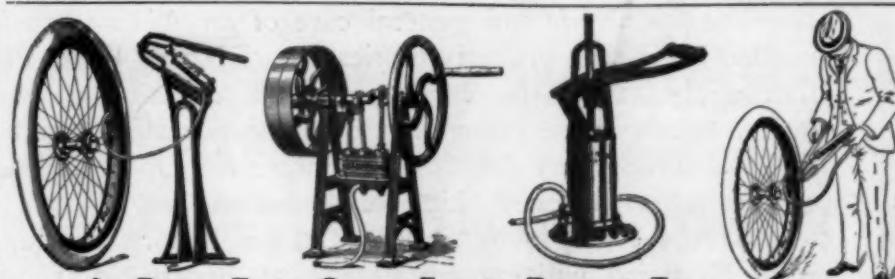
Seamless Steel Boiler and Tanks

STEAM

Patent Pilot Light,	Stanhope,	\$750
Holding Steam	Surrey,	900
Indefinitely	Delivery Wagons,	900

Milwaukee Automobile Co.

Milwaukee, Wis.



Mfrs. of Air Pumps, Tanks, Gauges, Etc., for Pneumatic Tires.

SEND FOR ILLUSTRATED BOOKLET.

Gleason-Peters Air Pump Co., 181-189 Mercer Street, New York, N. Y.

HALL'S LOCOBILE



Conditions found in Steam and Gasoline Carriages

Cylinders are small
High Piston speed.

High temperature in cylinders

They need

An Oil of high fire test

An Oil that will retain its viscosity at high temperature

An Oil that will not decompose with heat

An Oil free from acid

"Locobile" will do the work under these conditions

G. E. HALL, 211 Centre Street, New York

Aluminum Work of all kinds for Automobiles

Fine Castings
Sheet,
Stamped and
Spun Work
to Order

WE have given our exclusive attention to the working of Aluminum for nearly ten years, and are therefore in position to give the best possible results for all special requirements, and at lowest legitimate prices.

Our Castings are Hard, Tough and Strong.

Send Patterns for Sample Castings.

The Hill, Whitney & Wood Co., Waltham, Mass.

FRICTION REDUCED ONE-HALF BY THE USE OF DIXON'S PURE FLAKE GRAPHITE

The speed, life and general care of an Automobile is dependent on its working mechanism being properly lubricated. **Dixon's Pure Flake Graphite** will do this thoroughly. It is the very best solid lubricant known; we mine and prepare it ourselves, therefore know that only the purest materials are used.

We have many forms of Graphite for Open and Closed Gears, Motors, Axles, etc., suitable for every kind of Automobile.

At the Automobile Show, Madison Square Garden, November 3-10, our Mr. John H. Baird will explain its use at Booth No. 1.

PAMPHLET BY MAIL ON REQUEST

JOSEPH DIXON CRUCIBLE CO. Jersey City New Jersey

....FIRST ANNUAL....

AUTOMOBILE SHOW

Under the Auspices of the

Automobile Club of America

Madison Square Garden, Nov. 3 to 10, 1900

The following representative manufacturers will exhibit:

The National Automobile & Electric Co.,
Riker Motor Vehicle Co.,
The Winton Motor Carriage Co.,
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The Autocar Co.,
Foster Automobile Mfg. Co.,
Automobile Company of America,
Woods Motor Vehicle Co.,
Stanley Mfg. Co.,
Locomobile Co. of America,
Canda Mfg. Co.,
Daimler Mfg. Co.,
Waltham Mfg. Co.,
American Bicycle Co.,
Electric Vehicle Co.,
Holyoke Automobile Co.,
Knox Automobile Co.,
Overman Automobile Co.,

International Motor Carriage Co.,
New York Motor Vehicle Co.,
Trinity Cycle Mfg. Co.,
John T. Robinson & Co.,
Steam Vehicle Co.,
Peerless Mfg. Co.,
Springfield Cornice Works,
St. Louis Motor Carriage Co.,
Cunningham Engineering Co.,
Buffalo Electric Carriage Co.,
The Haynes-Apperson Co.,
Mobile Co. of America,
Jos. Dixon Crucible Co.,
C. J. Downing,
Diamond Rubber Co.,
C. F. Splitdorf,
Gray & Davis,
Veeder Mfg. Co.,
Rose Mfg. Co.,

B. F. Goodrich Co.,
Charles E. Miller,
Dow Portable Electric Assistant Co.,
Pennsylvania Auto. & Gear Co.,
Goodyear Tire & Rubber Co.,
Gleason-Peters Air Pump Co.,
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N. Y. Belting & Packing Co.,
Crest Mfg. Co.,
Hartford Rubber Wks. Co.,
Consolidated Rubber Tire Co.,
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Duryea Motor Co.,
Ward Leonard Electric Co.,
Bevin Bros. Mfg. Co.,
Metallic Rubber Tire Co.,
E. A. Brecher & Co.,
Janney, Steinmetz & Co.,
Badger Brass Mfg. Co.

Over 500 Different Styles of Vehicles will be shown.

Please mention THE AUTOMOBILE when writing to Advertisers.

Phineas Jones & Co.

Reputation International

All Kinds of Wood Wheels

For Automobiles

Established 1855

Kelly Springfield Tire Used.

Newark, N. J.



Grout Bros.

Immediate Delivery

Steam Wagon

Simplest, Surest, Safest and Quickest arrangement in existence. No Irons to heat; no fire blowing out. We built the first factory in the United States especially for the manufacturing of Motor Vehicles. Write for our catalogue which will illustrate and explain our wagon in detail.

GROUT BROS., ORANGE, MASS

Lee J. Aubry Carriage Company

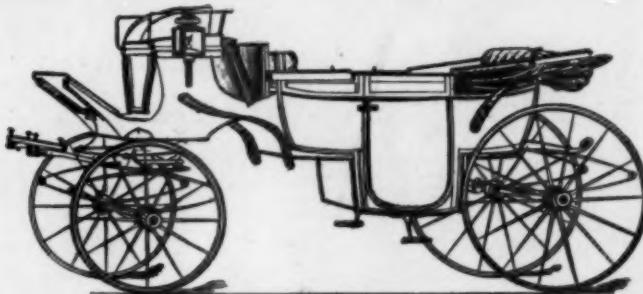
Manufacturers of...

LIGHT and HEAVY

Fashionable Carriages

139 Park Street

New Haven, Conn.



Broughams
Rockaways
Coaches
'Buses
Automobiles
Hearses
Hansom
Fancy Carts
Depot
Wagons
Wagonettes
and
Undertakers'
Wagons

Strathmore Automobile Company

Manufacturers of Steam,
Gasoline Automobiles for
all purposes



Repairing a Specialty.
Storage Room at Reasonable
Rates

OFFICE
Beacon St., Boston, Mass.

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North Cambridge, Mass.

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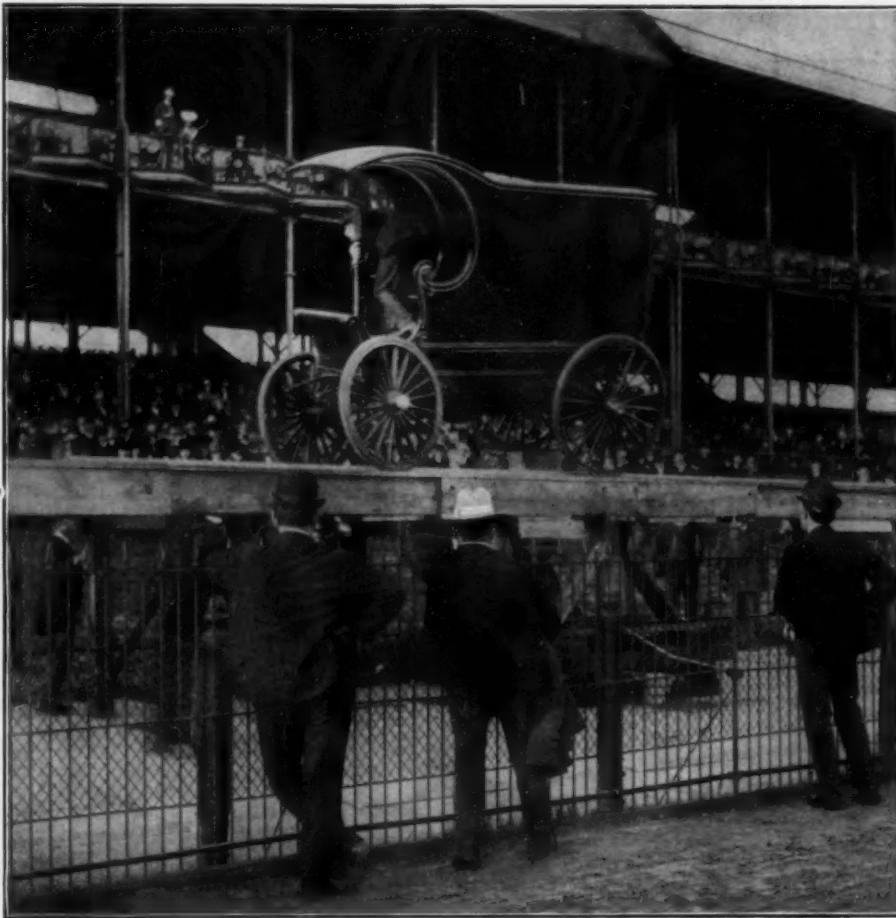
Practical Wagons for Practical People

Is our motto

Their Special Features are:

Simplicity of Operation,
Perfect Control and
Great Reserve Power

Note the Illustration



EXHIBITION OF CONTROL AT THE CHICAGO EXPOSITION.

THE Wagon shown is mounted on our No. 5 Running Gear, which is used in our Brakes for nine to twelve passengers, and in our Carettes, which seat from twelve to twenty-five people. We make a SPECIALTY of these two styles of vehicles, but build many others.

Write us for Catalogue and prices, stating what you require

Chicago Motor Vehicle Co., Ltd.

Factory, Harvey, Ill.

341 Wabash Avenue, Chicago, Ill.

Points to Be Considered in Buying an Automobile.

In buying a watch you do not think to judge of its excellence by looking at its works. You ask what is the reputation of the makers for turning out reliable time-keepers. So in buying an automobile you ask what has been the accomplishment of the machines turned out by the makers. "Has this make of automobile been proved in actual use?"

Six things must be kept clearly in mind:—

First. The running-gear and steering apparatus, upon which, when you are running rapidly, your life will depend—have they been entirely demonstrated to be equal to any strain over the roughest roads and for long distances?

Second. Is the machine able to produce its power rapidly, and continuously—that is, always reliably—and equal to the steepest hills?

Third. Have the working parts of engine and boiler, or other power-producing parts, been proved absolutely reliable over distances covering thousands of miles?

Fourth. Is the machine simple in its construction? Many machines are overloaded with attachments calculated to appeal to the imagination of the inexperienced and unwary buyer, but each one adding to the complication and weakness of the machine and sometimes a source of positive danger. Recollect that the fewer the attachments, the simpler the machine and the less likely to get out of order.

Fifth. Can the automobile ascend any hill in either city or country, and is its power generated in a way to permit it to travel any distance over country roads?

Sixth. What is the price?

These six points cover practically the whole subject of buying an automobile.

THE "MOBILE,"



A "MOBILE" DRIVEN OVER
4,000 MILES.

built by The "Mobile" Company of America, in their factory—the largest in the world—at Kingsland-Point-on-the-Hudson, stands tested and approved over all others, not merely in theory but in actual demonstration: not one demonstration, but thousands: not simple street running but the severest tests conceivable.



AN ORDINARY
"MOBILE," JUST
OUT OF THE FAC-
TORY STOCK-

ROOM, was driven by Mr. Frank Lambkin, of Norwalk, Ohio, from Kingsland Point to Chicago without breakage, interruption, or perceptible wear and tear of any kind. This same "Mobile" after being driven over four thousand miles was sold by Mr. Lambkin for the full price of a new "Mobile."

A "MOBILE" ASCENDS
PIKE'S PEAK.

trail over which this running was made has been practically abandoned for some years and in certain parts it represents the greatest possible difficulties in its irregularities and steepness. The entire distance of fifty miles was covered without break or injury of any kind except the puncture of one tire and breakage of water-glass.

A "MOBILE"
WON THE VANDERBILT CUP.

entered against the field in the steam race at Newport, September, 1900. Although as many as five machines of another firm —some of them racing machines especially constructed for this occasion—were in this race, the single carriage of the "Mobile" Company carried off the Vanderbilt cup.

SIMPLICITY OF DESIGN,
EXCELLENCE OF BUILD,
DURABILITY.

THE CHIEF CLAIMS MADE FOR THE "MOBILE" are, simplicity of design, excellence of material and workmanship, and durability in operation, equaled by no other automobile. It possesses ample power to climb the steepest roads, and "Mobiles" have covered thousands of miles without breakdown of any kind. The factory at Kingsland Point is thrown open to all visitors, and the expert is invited to criticise either material or methods, and will be compensated for any suggestion making an improvement in either material or workmanship. Five thousand dollars were offered for a "Mobile" we could build no better machine than that which we turn out for \$750.

ENDLESS TESTIMONY BY
THOSE WHO HAVE
OPERATED "MOBILES."

WE PRESENT BELOW SOME LETTERS FROM PROMINENT MEN SHOWING, not what the "Mobile" ~~what~~ theorized to do, or what it is hoped it may do, but it has actually done. It will be observed that some of the writers are purchasers who were totally inexperienced in the handling of machinery.



" 66 BROADWAY, NEW YORK, July 30th, 1900.

" W.M. HADDOCK, Esq., (Supt.) 'Mobile' Company of America, Tarrytown, N. Y. I have covered over seventeen hundred miles (1,700), on some of the best and some of the worst roads I ever saw. I climbed the Shawnee Hill near Delaware Water Gap, also the long mountain road up to Lake Mohonk, without an accident or breakdown, and have not broken my first water-glass.

" As I knew nothing about machinery when I bought my 'Mobile,' I feel that my freedom from accidents is in a great measure due to the excellence of the material and workmanship of your carriage. The pump has never failed to work, and I have not spent a dollar for repairs. I have certainly given the carriage a severe test, and I thought you might like to know the result.

" Yours truly, W. B. BOWNE."



"THE HOTEL ESSEX, BOSTON, MASS., Sept. 13, 1900.
"MOBILE' CO. OF AMERICA.

"GENTLEMEN:—Thinking you would be interested in an account of the performance of one of your carriages, I will state that my wife and I left Philadelphia and came to New York City; then north to Hudson, N. Y.; from Hudson across through Great Barrington and Lenox; through the Berkshire Hills to Pittsfield, Mass.; from Pittsfield to Springfield, Worcester and Boston—a distance of five hundred and ten miles. The road from Pittsfield to Springfield was very bad—steep hills, sand and dust. In fact, I don't think in the last three hundred miles there were over ~~seventy-five~~ ^{made by} ~~descent roads~~ ^{descent roads}. Time not being an object, we made the trip in eight days, an average of over ~~sixty~~ ^{forty} miles a day, and did not have a breakdown of any kind, and arrived in Boston with a good opinion of what your carriage could do under the most severe tests.

"Yours truly,

M. M. YOUNG."

"BOSTON, Sept. 12th, 1900.

"THE 'MOBILE' COMPANY OF AMERICA.

"GENTLEMEN:—Eight weeks ago I bought one of your carriages at the factory in New York. I rode it home to Boston and have used it constantly ever since.

"Yours truly,

WALTER G. CHASE."

"135 AND 137 BROADWAY, NEW YORK CITY, June 5, 1900.

"MR. JOHN BRISBEN WALKER, Prest. 'Mobile' Co. of America,

"Tarrytown-on-Hudson, N. Y. It is much easier to learn to operate and it is ~~Dear Sir: I am well pleased with my Mobile.~~ The instructor, Mr. Harry Fosdick, was especially well fitted for his task. He was so patient, so obliging and so careful that even in the preliminary stages the 'Mobile' has proved a pleasure. I thank you for sending so agreeable and capable a demonstrator.

"Yours truly,

E. D. EASTON,

"President Columbia Phonograph Company."

"53 STATE STREET, BOSTON, September 4, 1900.

"THE 'MOBILE' CO. OF AMERICA, Boylston St., Boston, Mass.

"GENTLEMEN:—You ask me how I like the 'Mobile' which I recently purchased from you. In reply, I would say that I have, in company with my wife, driven the machine several hundred miles during the past two weeks on a trip through the White Mountains. On this trip we encountered some of the worst roads that it has been my experience to travel over; but throughout the entire distance the machine behaved beautifully, and we had no mishaps of any nature.

Mrs. Bridge drove the machine over Hurricane Mountain, Intervale, the grade of which is said to be considerably steeper than that of the carriage road up Mt. Washington. Considering that I am not a mechanic and that I ~~had no experience with engines or machinery of this sort and that I~~ ^{was justified in saying that the} ~~Mobile~~ ^{is a machine which can be} ~~practically took no lessons~~ ^{operated successfully by} any person, man or woman, who will familiarize themselves with it and then remember the few details necessary to properly manage the machine and keep it in good order.

"Thanking you for the courtesy of your kind offer to look over my 'Mobile' when I desire, I remain,

Very sincerely yours,

J. RANSOM BRIDGE."

"YONKERS, N. Y., July 14, 1900.

"JOHN BRISBEN WALKER, Esq., 'MOBILE' COMPANY OF AMERICA, Kingsland Point, N. Y.

"DEAR SIR:—I have now had my motor wagon, purchased of your company, in daily use for a month. I have ridden on it several hundred miles, and am very much pleased with it. It has given me no trouble whatever, works perfectly in every way, and I regard it as a wonderfully complete mechanical contrivance for getting over the road. I anticipated some trouble from frightening horses, but find that nine out of ten pay no attention to it whatever, as it runs so quietly and rapidly that it is generally out of sight and hearing before the horse becomes aware of its existence.

Very truly,

CHAS. R. OTIS."

NOV 14 1900

"RINDGE MANUAL TRAINING SCHOOL, CAMBRIDGE, MASS., Sept. 17, 1900.

"THE 'MOBILE' COMPANY OF AMERICA, Boylston Street, Boston, Mass.

"GENTLEMEN:—In reply to your inquiry of the 15th, would say that Mrs. Morse and I have just completed our thousandth mile in the 'Mobile.' This carriage has been run over all kinds of roads, from the park drives to the sandy and rock roads of New Hampshire.

"The machinery seems to be in as good condition as when new. We have never been delayed for a minute by any defect, and have only words of praise for the vehicle. Truly, CHAS. H. MORSE."

"33 STANHOPE ST., BOSTON, MASS., Sept. 19, 1900.

"'MOBILE' COMPANY OF AMERICA, Kingsland-Point-on-the-Hudson, New York.

"GENTLEMEN:—We thought you might be interested in knowing that one of the principal reasons that led us to take the agency for the 'Mobile' was the fact that we had previously advertised quite extensively for second-hand automobiles, and had about one hundred second-hand machines on our list, and among this number there was but a single 'Mobile,' and this belonged to a physician who was having a new 'Mobile' built—with a specially shaped body.

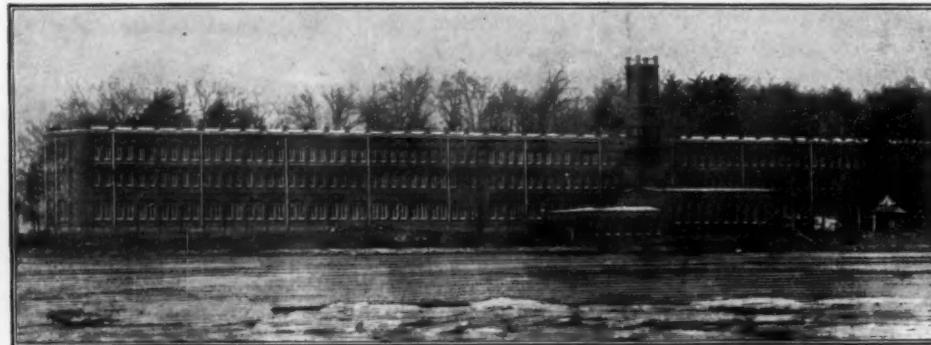
"There is only one conclusion that can be inferred from the above, and that is that the owners of 'Mobiles' are so well pleased with their machines that they do not care to sell.

"Respectfully yours, L. LEWIS, AUTOMOBILE HEADQUARTERS."

"IDEAL PLATING CO., 3 APPLETON ST., BOSTON, MASS.

"THE 'MOBILE' CO. OF AMERICA.

"GENTLEMEN:—About the 1st of September I purchased one of your carriages, and can say that I am more than pleased with it. The running of it is very simple, and it is very powerful, going up grades very easily and with good speed. It is surprising what power there is in the engine that drives it. My wife and I took our first long trip the other day to Springfield, and a very pleasant trip it was. My wife said that she was not near as tired going in the 'Mobile' as she would have been had she gone on the train. That speaks well for the ease with which one can ride on all kinds of roads in going two hundred miles in your 'Mobile.' I think it the best means for traveling on the road that I have ever used. Yours truly, PHILIP GOKEY."



FACTORY OF THE "MOBILE" COMPANY OF AMERICA—VIEW LOOKING NORTH.

Philipse-Manor-on-the-Hudson is the new station which the New York Central Railway has established in the center of the "Mobile" Company's Park. Twenty-five trains a day now stop regularly at this station

BRANCH OFFICES OF THE "MOBILE" COMPANY OF AMERICA:

BOSTON:	PHILADELPHIA:	CHICAGO:
346 Boylston Street.	Cor. Juniper and Filbert Sts.	Van Buren St. and Wabash Ave.
BUFFALO:	NEWPORT:	WASHINGTON CITY:
609 Main Street.	115 Bellevue Avenue.	1116 Connecticut Ave. N.W.

The "Mobile" Company of America.

KINGSLAND POINT, TARRYTOWN-ON-THE-HUDSON, N. Y.

JOHN BRISBEN WALKER, President.
WILLIAM A. BELL, Vice-President.
DAVID STROTHER WALKER, Treasurer.
WILLIAM HADDOCK, General Supt.

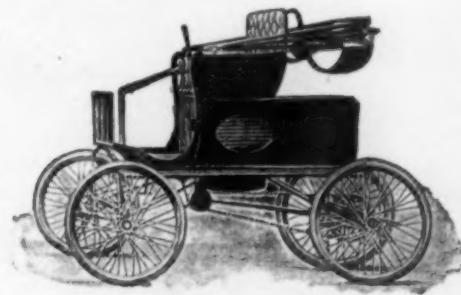
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												Monday
												Tuesday
												Wednesday
												Thursday
												Friday
												Saturday

Every Day
Finds the contented owner of a Baldwin (steam) Automobile better satisfied with his choice.

Every Month
Brings a change in weather. The BALDWIN (steam) Automobile is designed to meet these variances.

SEND FOR CATALOGUE

Baldwin Automobile Mfg. Co. Connellsburg, Penna.



"TRIUMPH"

A U T O M O B I L E S

"ALL THEIR NAME IMPLIES"

Electric

Steam

Gasoline

We are prepared to accept orders for our Electric Stanhope for Delivery in Sixty Days. Gasoline or Steam Vehicles for Ninety Days Delivery . .

SEND FOR DESCRIPTIVE CIRCULAR
(Mention this Paper.)

TRIUMPH MOTOR VEHICLE COMPANY

1012-1013 MONADNOCK BLDG., CHICAGO.

For Business

"Riker" Automobiles

For Pleasure

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20-PASSENGER OMNIBUS.

Riker Motor Vehicle Co.

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GASOLENE

More than One Thousand in Use

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Victorias
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